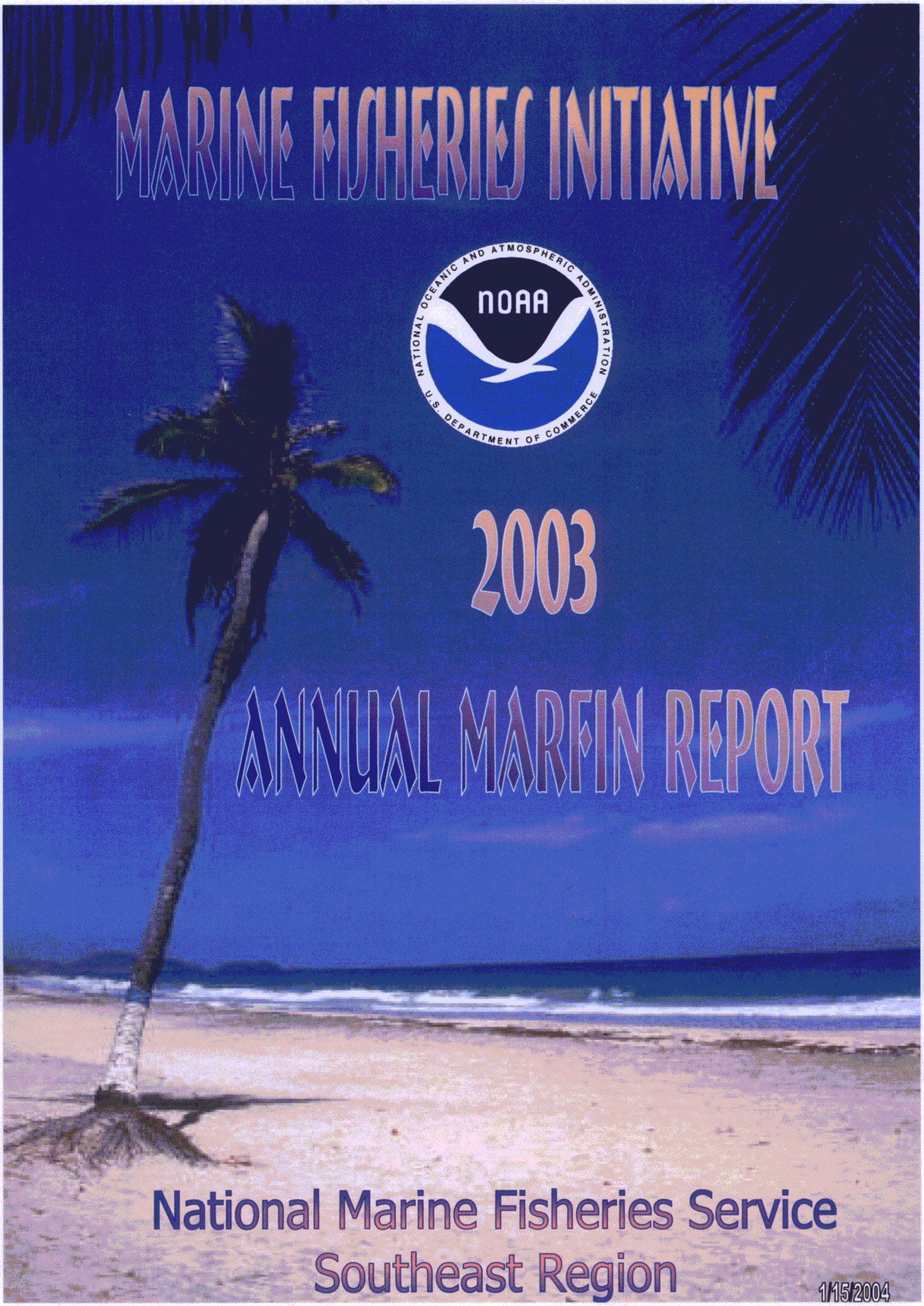
MARINE FISHERIES INITIATIVE



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ANNUAL MARFIN REPORT

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Marine Fisheries Initiative Program

(MARFIN)

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PREFACE

The Marine Fisheries Initiative (MARFIN) promotes and endorses programs which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts that evoke the best research and management talents of the Southeast Region. Preference is given to cooperative planning efforts with up to 3-year time horizons. The intent is to focus projects funded by MARFIN into cooperative efforts that provide clear answers for fishery needs covered by the National Marine Fisheries Service (NMFS) Strategic Plan for Fisheries Research[1]. Goals one, two and four are particularly important. For example, a geographically restricted age and growth study of a local fishery resource is of limited value unless it is coordinated with, or verified by, similar studies which span the range of the resource. The value of such studies is also relatively limited unless the results can be combined with other studies to provide a regional assessment of the resource. MARFIN provides this necessary programmatic integration through cooperative planning, accomplishment of program activities and an annual MARFIN Conference.

The MARFIN program was created to bring together scientific, technical, industry, resource conservation, and management talents to conduct cooperative programs to facilitate and enhance the management of the marine fishery resources of the Gulf of Mexico and South Atlantic. MARFIN requires the timely dissemination of the results of both successful and unsuccessful efforts; therefore, each recipient of funding under this program is obligated to attend a MARFIN conference to report project findings. The bycatch issue remains a focal point of research needs for the Southeast Region. Critical reef fish fisheries are also being addressed, from efforts to reduce catches associated with shrimp trawls, to life history studies, as well as fishery-dependent and independent characterization work. Delineation of fishery stocks (king mackerel, Gulf red snapper, South Atlantic red porgy, wahoo and dolphinfish) continue to be an area of important research effort toward enhancement management of these commercially and recreationally vital fisheries. Research on economic and sociological impacts of fisheries regulations, including the establishment of marine fishery reserves, illustrates the recognition by the MARFIN program that all aspects of a fishery, including essential fish habitat, must be understood to provide adequate fisheries management.

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[1]NMFS Strategic Plan Goals:

- Provide scientifically sound information and data to support fishery conservation and management
- Through conservation engineering research contribute to efforts to reduce bycatch and adverse effects on EFH, promote efficient harvest of target species, and to improve the data from fishery surveys.
- Through economic and ecological research on marine communities and ecosystems, provide scientific data and information to increase long-term economic and social benefits to the Nation from living marine resources.
- Improve the fishery information system.
- Improve the effectiveness of external partnerships with fishers, managers, scientists, conservationists, and other interested groups.

HISTORY OF THE MARFIN PROGRAM

The MARFIN Program received its initial impetus from a 1983 discussion paper entitled: "Research Needs For Information Leading To Full and Wise Use of Fishery Resources In The Gulf of Mexico," by Dr. Thomas D. McIlwain of the Gulf Coast Research Laboratory while he was in the office of then Representative Trent Lott[1]. This paper, sometimes referred to as the Lott-McIlwain paper, proposed an additional investment in fisheries research and development in the Gulf of Mexico to increase the economic contribution of marine fisheries, develop more valuable products from existing fisheries, develop export markets, forecast variation in yields and conserve and maintain presently exploited resources.

The next step in the evolution of MARFIN was the preparation and publication of the Marine Fisheries Initiative - Gulf of Mexico Phase[2]. This publication, developed by a joint industry, federal, state and academic task force, detailed the research and development efforts necessary to enhance, restore and maintain fisheries in the Gulf of Mexico. The program focused on funding projects which had the greatest probability of maintaining and improving existing fisheries, increasing revenues for the domestic industry, increasing yields from fisheries and generating increased recreational opportunity and harvest potential. Projects were to be selected for funding on their likelihood of achieving these benefits through both short-term and long-term research with consideration of the magnitude of the eventual benefit that might be realized. Both short-term projects yielding immediate benefits and long-term projects were to receive high-priority emphasis. Planning emphasis was placed upon attaining priority goals either through a single project or a series of projects necessary to attain that goal.

In 1992, the MARFIN program was expanded to include a South Atlantic component (North Carolina, South Carolina, Georgia and the Atlantic coast of Florida). The goals and objectives of the South Atlantic Phase of MARFIN are described in Special Report No. 13 of the Atlantic States Marine Fisheries Commission, Marine Fisheries Initiative (MARFIN) South Atlantic Phase[3].

The Lott-McIlwain paper and the Marine Fisheries Initiative publication were instrumental in gaining public support for the MARFIN program. On December 4, 1985, the conference report of the House and Senate that appropriated funds for the Departments of Commerce, Justice, State, the judiciary and related agencies for the fiscal year (FY) ending September 30, 1986, allocated $2,850,000 for the MARFIN Program.

The following list represents funding for each year from the start of the MARFIN program until the current year:

* Fiscal Year 1986 - $2,850,000

* Fiscal Year 1987 - $3,500,000

* Fiscal Year 1988 - $3,500,000

* Fiscal Year 1989 - $3,000,000

* Fiscal Year 1990 - $3,000,000

* Fiscal Year 1991 - $2,986,000

* Fiscal Year 1992 - $4,000,000 (This includes $500,000 of the South Atlantic MARFIN and $1,300,000 for shrimp trawl bycatch studies.)

* Fiscal Year 1993 - $3,540,000

* Fiscal Year 1994 - $3,542,000

* Fiscal Year 1995 - $3,540,000

* Fiscal Year 1996 - $2,760,000 (No new projects were accepted during FY 1996 due to a reduction in congressional allocation, and because of the large number of active multi-year projects selected during previous funding cycles.)

* Fiscal Year 1997 - $3,000,000

* Fiscal Year 1998 - $3,000,000

* Fiscal Year 1999 - $3,000,000 (This includes $500,000 for the Northeast Region.)

* Fiscal Year 2000 - $2,750,000 (No new projects were accepted during FY 2000 due to a reduction in congressional allocation, and because of the large number of active multi-year projects selected during previous funding cycles.)

* Fiscal Year 2001 - $3,500,000 (This includes $250,000 for the Northeast Region and $750,000 for red snapper research.)

* Fiscal Year 2002 - $3,500,000 (This includes $250,000 for the Northeast Region and $750,000 for red snapper research.)

*Fiscal Year 2003 - $3,250,000 (This includes $250,000 for the Northeast Region and $500,000 for red snapper research. No new projects were accepted during FY 2003 because of the large number of active multi-year projects selected during previous funding cycles.)

MARFIN promotes and endorses programs which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts that evoke the best research and management talents of the Southeast Region. The intent of the MARFIN program is to focus projects on key fisheries' issues in the southeast United States.

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[1]Office of Representative Trent Lott, Washington, DC; Dr. Thomas D. McIlwain; May 1983

[2]Gulf States Marine Fisheries Commission, P.O. Box 426, Ocean Springs, MS 39564; J.Y. Christmas, D.J. Etzold, T.D. McIlwain, L.B.Simpson, Eds. January 1985

[3]Special Report No, 13 of the Atlantic States Marine Fisheries Commission; E.J. Joseph, V.G. Burrell, D.M. Cupka, P.J. Eldridge, August 1988

MARFIN PROGRAM ORGANIZATION AND ADMINISTRATION

The NMFS Southeast Regional Administrator (RA) reformed the MARFIN Panel in FY 1992 when the program was expanded to cover the South Atlantic (Appendix 1). Each member of the MARFIN Panel provides individual recommendations to the RA on MARFIN priorities and financial assistance applications. The MARFIN Panel membership is as follows:

- One state marine conservation agency representative each, from the Gulf of Mexico and the South Atlantic areas.
- One representative each from the Gulf of Mexico and the South Atlantic commercial fishing industries.
- The Executive Directors of the Gulf of Mexico and South Atlantic Fishery Management Councils.
- The Executive Directors of the Gulf and Atlantic States Marine Fisheries Commissions.
- One representative each from the Gulf of Mexico and the South Atlantic recreational fishing industries.
- One representative each from the Gulf of Mexico and the South Atlantic Sea Grant Universities.
- A NMFS Southeast Fisheries Science Center Technical representative.
- The NMFS Southeast Region Program Officer acts as an advisor to the Regional Administrator and MARFIN Panel members concerning Federal, Department of Commerce, and NOAA financial assistance administration requirements.

Alternate representatives to the MARFIN Panel serve when necessary. Individual Panel members are appointed by the NMFS Southeast Regional Administrator for staggered terms.

The RA of the NMFS Southeast Regional Office relies on recommendations from individual members of the MARFIN Panel, the MARFIN Scientific Panel, and the Regional Program Office in selecting each year's projects.

Each year the MARFIN Panel and NMFS administrators and scientists identify areas of emphasis for the next year's competitive financial assistance program. These areas of emphasis are published in the Federal Register for public comment. After public review and comment, an announcement of funding availability through the competitive MARFIN financial assistance program is published as a solicitation in the Federal Register.

The NMFS Southeast Regional State/Federal Liaison Office staff is responsible for the overall administration of all NMFS Southeast grants and cooperative agreement programs, including MARFIN (Appendix 2). Their responsibilities include planning, application and selection, negotiation, performance, monitoring and close-out of all assigned competitive and noncompetitive

financial assistance programs. A NMFS Southeast Regional scientific or technical expert is assigned as the Technical Monitor for each MARFIN project. The Technical Monitor is responsible to the State/Federal Liaison Office Program Officer for all technical and cooperative aspects of assigned projects. The NOAA Grants Officer is responsible for the overall administration of each NMFS financial assistance award issued to recipients outside of the Federal government and cooperates with the NMFS Southeast Region State/Federal Liaison Office in administering each financial assistance award.

FY 2003 PROGRAM HIGHLIGHTS

The Fifteenth Annual MARFIN Conference, held in Biloxi, Mississippi, on December 03-04, 2003, was the forum in which scientists presented results of ongoing MARFIN projects. A summary of project highlights follow. It should be noted that staff of the State-Federal Liaison Office developed the summary, thus, any errors in the highlights should not be attributed to the principal investigator of the project although all project leaders were given the opportunity to comment on the highlights.

(William Sharp, FL Fish and Wildlife Conservation Commission)
Intercept Surveys of Recreational Spiny Lobster Fishermen in the Florida Keys

Mr. Sharp summarized the preliminary results of an intercept survey of recreational spiny lobster landings in the Florida Keys during 2002. There are approximately 130,000 licensed recreational lobster fishermen in Florida and two-thirds of the recreational catch is taken in Monroe county. Two main objectives of the survey were to collect recreational landings data in the Florida Keys and compare these data with data formerly collected by mail surveys, and to obtain length frequency data of recreational landings to determine if the size composition of recreational and commercial landings are similar.

Comparison of the size composition data of recreational and commercial landings showed that the distributions of sizes was the same for both fisheries. This is important because it allows managers to estimate the total recreational catch over time because there is no difference between the mean size of lobsters in the two fisheries. The intercept data revealed that the individual fisher cost per unit effort (CPUE) did not differ between survey methods during the special two-day recreational season; nor did individual and fishing party CPUE vary during the regular season. However, the survey did reveal that the fishing party CPUE during the two-day special season did differ significantly from results of the mail survey. This, apparently, is caused by the difference in party size between visitors and fishermen who live in the Keys. The intercept survey included only public boat ramps and marinas and did not cover residential canals where most residents keep their boats. Another result of the survey indicates that the share of the lobster catch, taken by traps, is declining. Conversely, catches of recreational fishermen and commercial divers is increasing, especially the catch of divers. This result appears to be an unanticipated consequence of the trap-reduction program (the number of traps has declined from 700,000 to 500,000). **MARFIN Award NA17FF2011**

(Dr. Richard Nemeth, University of Virgin Islands)
Investigating Movement Patterns and Spawning Habitat of Red Hind Grouper in a Newly Established Marine Fishery Reserve in the U.S. Virgin Islands

Dr. Nemeth described the movement patterns and spawning habitat of red hind grouper in a newly established marine fishery reserve Marine Conservation District (MCD) in the U.S. Virgin Islands. Hook and line surveys were used to document the location of the primary spawning

aggregation site within the MCD. Fish counts along transects within and without the MCD were also conducted to document reef fish community structure and establish a baseline for evaluating the future effectiveness of the MCD. Red hind were captured on the spawning aggregation, measured, tagged and released.

Preliminary results show that the abundance of red hind, as indicated by trap CPUE, almost doubled between January 2000 and January 2001 as did the maximum density of spawning red hind. Further, the average length of red hind at the spawning aggregation site increased significantly. Results also indicate that most fish travel upstream to spawn, which allows larvae to drift back to juvenile feeding areas. Peak spawning occurred during January and February. Spawning males were larger than females. It was noted that tag returns were only received from recreational fishermen–no tags were turned in by commercial fishermen. The project revealed that there was considerable tag loss caused in part by parrotfish. The results indicate that the MCD has made a significant contribution to the recovery of the red hind resource as noted by the increased number of spawners and their larger size (more eggs produced). Project results suggests that management measures should, where possible, take into account known areas of spawning aggregations because such aggregations may behave similar to discrete stocks. **MARFIN Award NA97FF0348**

(Dr. Robert Shipp, presented by Dr. William Patterson, University of South Alabama)
Discrimination Among U.S. South Atlantic and Gulf of Mexico King Mackerel Stocks with Otolith Analysis and Otolith Microchemistry

Dr. Patterson described a study to discriminate among U.S. South Atlantic and Gulf of Mexico king mackerel stocks by examining otolith shape and otolith microchemistry characteristics. King mackerel were sampled from the South Atlantic and Gulf of Mexico in summer 2001 and 2002 when stocks were separated. Fish were also sampled in winter 2001-02 and 2002-03 when stocks were mixed around the southern tip of Florida. Otolith shapes were digitized and appropriate software was used to compute otolith roundness, circularity, rectangularity, area, perimeter, and the first 20 Fourier amplitudes. The relationship between all shape variables and fish size was removed by subtracting the common slope. Stepwise discriminant function models were built with shape data to distinguish between stocks. Maximum likelihood models were parameterized with summer shape data and applied to winter landings to estimate the stock composition of winter landings from each south Florida zone. Then, otoliths were processed for chemical analyses. Statistical analysis of stock-specific otolith elemental signatures of summer-collected fish and estimation of stock composition of winter landings followed the same methodologies as were used with otolith shape data.

Results from otolith shape analyses indicate that shape data should be handled separately for males and females and between years. Results indicate that shape analyses can be used to distinguish between king mackerel stocks. Otolith chemistry analyses and statistical tests are ongoing, but preliminary results indicate higher stock classification accuracies for summer-sampled fish than those achieved with shape data. The results indicate that assigning all winter landings from the mixing zone in south Florida to the Gulf stock does not reflect true mixing conditions. This could have implications on future assessments of king mackerel stocks. Basically, it would assign more fish to the south Atlantic stock which could result in a reduced

total quota for the Gulf of Mexico management unit (reduced landings targets based on a reduced maximum sustainable yield (MSY) estimate for the Gulf king mackerel resource). **MARFIN Award NA17FF2013**

(Karen Burns, Mote Marine Laboratory)
Partitioning Release Mortality in the Undersized Red Snapper Bycatch: Comparison of Depth vs. Hooking Effects

Ms. Burns described progress on a study of hook type and capture depth on release mortality of red snapper taken by the recreational and recreational-for-hire sector. Healthy fish were placed in hyperbaric chambers simulating depths of 140 and 200 feet. Fish were observed under varying depths of capture. Necropsies were performed to determine trauma and document healing. Survival was assessed after seven days. Circle and J hooks were used to determine their respective mortality impacts.

The results of the barotrauma experiments confirmed that mortality rates increased with depth of capture. Healing of swim bladders occurred within four to seven days. Red snapper tested at both depths (140 and 200 feet) were able to feed normally within four hours of being removed from the hyperbaric chamber. A tag and recapture experiment suggests that release mortality may be slightly higher with J than Circle hooks. Overall, red snapper suffered higher mortality from hook damage than barotrauma over the depths tested both in field and laboratory studies. **MARFIN Award NA97FF0349**

(Shannon Whaley, FL Fish and Wildlife Conservation Commission)
Relationships between Estuarine Habitat Structure and the Spatial Distribution and Abundance of Juvenile Fishery Species in Charlotte Harbor, Florida (Pilot Study)

Ms. Whaley described relationships between estuarine habitat structure and the distribution of selected fish species (juveniles) in Charlotte Harbor, Florida. Results of the data were portrayed in maps produced by a Geographic Information System (GIS). GIS layers described the following habitats: patchy and continuous seagrass beds, mangrove and salt marsh habitats and shorelines. Fish distribution data along with selected hydrographic features were compared to determine the probability of encountering specific species in the different habitat-hydrographic conditions.

The project demonstrated that GIS maps can be constructed to help determine broad-scale fishery species occurrence and abundance for selected habitat types. Such maps can be used to determine essential fish habitat (EFH) for key species and can be used to estimate the area of EFH. The project shows that juvenile red drum are most likely to occur, and have the highest densities in the lower portions of the Peace and Myakka Rivers; whereas, juveniles of lane snapper, gray snapper and white grunt are most abundant in areas near the passes connecting Charlotte Harbor to the Gulf of Mexico. Resulting maps depicting areas with the highest species occurrence were often similar in spatial distribution to those maps depicting the highest relative abundance for most of the modeled species. The best results were obtained with models describing those species that were relatively rare (especially white grunt and lane snapper). Results of the study can be used to evaluate the potential impact of development upon EFH. **MARFIN Award NA17FF2866**

(Dr. David Letson, presented by Manoj Shivlani, University of Miami)
Economic Valuation of Marine Reserves in the Florida Keys as Measured By Diver Attitudes and Preferences: Implications for Valuation of Non-Consumptive Uses of Marine Resources

Mr. Shivlani described a study to evaluate the economic valuation of marine reserves in the Florida Keys as measured by diver attitudes and preferences. The study evaluated the monetary value that divers place on (and willingness-to-pay) for marine reserves in the Florida Keys. Over 20 sites and 12 dive operators were contracted to participate in the study. In the survey area, over 800,000 diving trips, including over 3 million divers, occur annually. Most divers were under 40 years of age and diving was one of several activities that caused them to visit the Florida Keys. Almost 60% took only one dive trip, but 77% reported making multiple trips. Most divers had been diving five years or less.

The most popular activities were non-consumptive including marine identification (47%) and underwater photography (42%). About 80% of divers relied upon dive operators to select a site. The vast majority of divers were satisfied with their diving experience. Less than 10% felt that sites were crowded, but there was some disappointment with water clarity. Most divers and snorkelers reported having their expectations met for seeing large fish, different kinds of fish, and large animals. Forty percent of participants were willing to pay an additional $9.61 per person per year for exclusive access to the site and it marine resources. This is in addition to operator fees which ranged between $25 and $60. It was noted that dive operators, by selection of sites, minimized the impact of crowding. **MARFIN Award NA17FF2869**

(Dr. Charles Wilson & David Nieland, presented by Andrew Fisher, Louisiana State University)
Red Snapper, *Lutjanus campechanus*, in the Northern Gulf of Mexico: Age and Size Composition of the Commercial Harvest and Mortality of Regulatory Discards

Mr. Fisher discussed the fate of regulatory discards from the commercial red snapper fishery in the northern Gulf of Mexico. In addition, the project estimated the distribution of ages and sizes of a random sample of potential discards. Louisiana State University personnel accompanied fishermen onboard red snapper commercial handline fishing vessels during 16 trips from November 2001 through April 2003. Regulatory discards were classified as: 1) alive, and swam down vigorously; 2) alive, but swam down slowly or erratically; 3) alive, but floated and remained at the surface; or 4) unresponsive or dead. Approximately, 25 discards from each trip were sampled for age and length analysis. Fish were caught at depths from 9 to 85 m (mean = 46 m).

Based on qualitative characteristics of the discard release condition, 69% of fish returned to water were dead or near dead as indicated by their failure to submerge. Discard mortality in this study is considerably higher than the estimated mortality rate of 33% used in previous red snapper stock assessments. It was noted that pelicans and dolphins followed fishing vessels and caused considerable mortality. About 86% of discards were age two fish. Most discards (86%) were 12 inches or larger in size. Fishing operations occurred primarily during the daytime with 20 to 60 hooks per reel. Hooks with fish were retrieved and put on deck until new baits and hooks were deployed. This resulted in hooked fish being on deck for some time which could lead to increased

mortality of discarded fish. Such fishing could result in more regulatory discards. **MARFIN Award NA17FF2007**

(Dr. Sandra Diamond, Texas Tech University)
Estimating Discard Rate and Release Mortality of Red Snapper in Texas Fisheries

Dr. Diamond described a study to estimate delayed mortality and discard rate of red snapper off Texas taken by charter and headboats. The first part of the study investigated delayed mortality using physiological indicators of stress (plasma cortisol, lactate and osmolality) coupled with visual inspections of caged snapper to estimate delayed mortality. Fish were sampled at three depths (90, 130, and 150 feet) and three sampling periods (July, September, late October). Captured fish were tagged, placed in individual cages beneath the platform at 60 feet, and observed on a daily basis for condition and mortality.

Preliminary results show that mortality was highest in the summer and fall sampling periods (June, September) and at the deepest sites (130, 150 feet). Blood samples are currently being processed, thus, these results were not available. In the second part of the experiment, observers rode aboard charter and headboats to estimate discard rate and immediate mortality. The average discard rate from all locations was 70%. Immediate mortality rates have not yet been analyzed. Preliminary results from caged fish indicate substantial delayed mortality for discarded fish. The preliminary results indicate that a higher discard mortality rate for recreational fishing activities may have to be used in the next red snapper assessment. The study will attempt to develop a system to estimate delayed mortality estimates from the condition of fish that are discarded from charter and headboats. Such a system would improve the accuracy of stock assessments. **MARFIN Award NA07FF2012**

OVERVIEW OF ONGOING RESEARCH PROJECTS

The following project description provides the title and objectives/goals of ongoing research funded through the MARFIN Program in the Southeast Region:

A. Bycatch

1. Shrimp trawl fisheries

a. "Enhancing industry contributions towards documentation of fishing effort and bycatch reduction in the shrimp fishery in the southeastern United States"- a one year, $535,095 project to field test ten promising industry bycatch reduction devices (BRD). The testing will include underwater hydrodynamic performance tests, prototype BRD construction and tuning, and actual field certification testing aboard commercial shrimp trawls fishing within U.S. federal waters. **MARFIN Award NA17FF2009**

b. "Genetic impacts of shrimp trawling on Gulf red snapper"- a one year, $68,825 project that will assay allelic variations at 20 nuclear-encoded microsatellites from samples taken during shrimp trawling and representing five subregions in the northern Gulf of Mexico, determine whether juveniles taken as bycatch represent random samples of genotypes within each subregion, and determine whether red snapper assemblages in the five subregional localities are increasing or decreasing in effective population size. **MARFIN Award NA17FF2014**

c. "Behavior and swimming performance of red snapper, *Lutjanus campechanus*: Its application to bycatch reduction"- the second year of a three year, $212,997 project to consider the effects of size, season, and time of day on red snapper behavior and swimming. With the aim of using this information to produce more effective bycatch reduction. In addition the project will evaluate a vortex generating bycatch reduction device to assess its ability to reduce capture of juvenile red snapper during shrimp trawl operations. **MARFIN Award NA17FF2031**

d. "Technology transfer of new turtle excluder device modifications and updated bycatch reduction device information to the southeastern shrimp fishery"- a one year, $171,000 project that will provide the shrimping industry with a clear description of new TED regulations and provide information on new BRDs as well as the status of prototype gears being tested. Meeting and workshops will be conducted from North Carolina through Texas, using Foundation specialists, to provide up-to-date information to shrimp fishermen, net shop owners, and other interested parties. **MARFIN Award NA17FF2867**

2. Reef fish fisheries

a. "Evaluation of the efficacy of current minimum size regulations for selected reef fish based on release mortality and fish physiology"- the second year of a two year, $359,804 project that will determine if red grouper are more susceptible to depth-induced mortality than red snapper, test

whether smaller red grouper survive rapid decompression better than larger red grouper, and to obtain catch and release mortality rates for red grouper, red snapper, vermilion snapper, and mangrove snapper. The first two areas of investigation will center around the swim bladder's size and structures such as the bundles of rete mirabile and the amount of gas gland cells. **MARFIN Award NA17FF2010**

b. "Estimating discard rate and release mortality of red snapper in Texas fisheries"- the second year of a three-year, $354,244 project to estimate delayed release mortality of red snapper under controlled conditions and find physiological indicators of delayed release mortality using blood samples from caught fish. Using this information the project will also estimate the discard rate and delayed release mortality in commercial and recreational fisheries. In addition released red snapper will also be tagged to estimate recapture rate by the fisheries. **MARFIN Award NA17FF2012**

B. Reef Fish

1. Basic biological data

a. "Validation of ages for species of the deepwater snapper/grouper complex off the coast of the southeastern United States"- the second year of a two-year, $69,463 project to validate increment counts from otolith sections of tilefish, snowy grouper, blackbelly rosefish, blueline tile fish and wreckfish using accelerator mass spectrometry analysis of delta 14C present in otoliths. Validation of increment counts, as an estimate of age, is critical if any age-structured management is used for a species. **MARFIN Award NA17FF2870**

b. "Red snapper *Lutjanus campechanus* in the northen Gulf of Mexico: Age and size composition of the commercial harvest and morality of regulatory discards"- the second of a three year, $298,016 project to obtain length and ages of red snapper randomly selected from the commercial fishery in the northern Gulf of Mexico which will allow the description of the size and age composition of the harvest. Observers on board commercial vessels will qualitatively assess release mortality of red snapper regulatory discards. **MARFIN Award NA17FF2007**

c. "The use of lipofuscin for aging Caribbean spiny lobster (*Panulirus argus*)"- the second year of a two year, $115,281 project to make an accurate determination of the ages of lobsters from the Florida Keys and Dry Tortugas to develop a complete growth curve and age-length keys. Lobsters of known age will be used to calibrate the age-length keys. Knowledge gained on this species general growth parameters will be used in fisheries management. **MARFIN Award NA17FF2871**

2. Population assessment of reef fish

a. "Stock structure of red porgy, *Pagrus pagrus*, in the North Atlantic"- the second year of a three year, $280,092 project to determine stock identification in red porgy by examining variation in mtDNA and nuclear microsatellites. Samples will be taken in the South Atlantic Bight, which has been over-fished for red porgy, and in the Gulf of Mexico, where red porgy populations are in better condition. **MARFIN Award NA17FF2008**

b. "Stable isotopes as tracers of patterns in habitat utilization by juvenile red snapper"- a one year, $44,823 project that will use stable isotopic composition of red snapper tissues as chemical tracers of food web dynamics and dietary shifts. The project will examine juvenile red snapper collected over open sand bottom, low-relief shell rubble reefs, and artificial reefs to determine if the stable isotope composition (Carbon 13 and Nitrogen 15) differ among these habitats. **MARFIN Award NA17FF2875**

c. "Demographics, density, and seasonal movement patterns of reef fish in the northeastern Gulf of Mexico associated with marine reserves"- the second year of a two year, $373,531 project to characterize population parameters of all fisheries species associated with the Madison-Swanson and Steamboat Lumps Fishery Reserves on the eastern Gulf of Mexico shelf edge. Fish species demographics, density, and seasonal movements will be studied in the reserves and outside the reserves to allow for the comparison of fishing effects on these characteristics. **MARFIN Award NA17FF2876**

3. Management of reef fish

a. "Can Marine Protected Areas conserve genetic diversity in tomtate, *Haemulon aurolineatum*, and French grunt, *H. flavolineatum*?"- the second year of a three year, $281,889 project to assess the levels of genetic variation within and among populations of tomtate and French grunts using mitochondrial and nuclear DNA. This project will also evaluate the degree of population isolation in light of the requirements of current ecological models evaluating the impact of marine protected areas (MPAs). **MARFIN Award NA17FF2878**

b. "An economic analysis of fleet dynamics in the Gulf of Mexico grouper fishery"- the second year of a two year, $208,980 project that will determine the active population of Gulf grouper vessels and analyze the factors determining gear choice decisions. The project will also identify the impacts of overall level of effort, fleet characteristics, and relevant regulatory and economic factors on the seasonal and spatial distribution of fishing effort targeting the Gulf grouper complex and analyze the impacts of alternative management policies on grouper harvests and production technology. **MARFIN Award NA17FF2879**

4. Evaluation of marine reserves as a fishery management tool

a. "Marine Reserve effectiveness in restoring coastal food webs: An experimental test using the Special Protection Areas and an Ecological Reserve in the Florida Keys National Marine Sanctuary"- the second year of a two-year, $183,578 project to examine the impacts of large piscivorus fishes on food web structure in and around coral reefs, the importance of linkages among seagrass and coral reefs in the re-establishment of these food webs, and the effects of habitat structure on the success of marine reserves. The project will take advantage of the rare opportunity to use replicated 'no-take' (predator rich) and unprotected (predator poor) reefs in the Florida Keys National Marine Sanctuary. **MARFIN Award NA17FF2015**

C. Red Snapper Research

1. Red snapper bycatch

a. "Geographic comparison of age, growth, reproduction, movement, and survival of red snapper off the state of Florida"- the second year of a three year,$623,161 project that will examine several factors affecting bycatch mortality. The project will specifically test whether circle hooks reduce release mortality in red snapper and the effects of depth and gear on release mortality. In addition the project will determine tag retention and obtain movement patterns for red snapper in the Gulf of Mexico and the southern U.S. Atlantic. **MARFIN Award NA17FF2881**

2. Red snapper biological information

a. "Assessment of bathymetric highs as nursery habitat of newly settled red snapper"- the second year of a two year, $211,469 project to couple active acoustic surveys with trawling data to provide fine scale resolution of habitat utilization by new recruits. The project will also combine estimates of growth and abundance to predict recruitment potential of juvenile fish from different bathymetric highs as well as different habitat types. **MARFIN Award NA17FF2872**

3. Red snapper population assessment

a. "Development of assays for major histocampatibility complex (MHC) Class I and Class II loci in Gulf red snapper for use in stock structure analysis and assessment of genetic health"- the second year of a two year, $68,700 project to develop polymerase-chain-reaction (PCR) primers that optimize identification of orthologous from paralogous major histocompatibility complex genes in Gulf red snapper. The long term goal of the project is to use genetic tools developed in studies of stock structure and immune response capability to resist parasites, pathogens, and other cytotoxic challenges. **MARFIN Award NA17FF2880**

4. Management of red snapper

a. "Linking spatial-temporal population size structures and fishing effort dynamics to assess the effectiveness of minimum size for red snapper management"- the second year of a two year, $171,143 project to develop a state-of-the-art size-structures yield per recruit model for use in an assessment of the effectiveness of using minimum size as a viable red snapper management option. The project will provide regional and sub-regional perspective of exploitation impacts under minimum size framed by seasonal quota constraints. **MARFIN Award NA17FF2865**

b. "Bioeconomic analysis of the red snapper rebuilding plan and transferable rights policies in the Gulf of Mexico"- the second year of a two year, $122,319 project to modify the General Bioeconomic Fisheries Simulation Model to include five vessel classes that fish for red snapper. The model will be calibrated with the most recent data for shrimp, red snapper, and vermillion snapper and then analysis will be conducted on the proposed red snapper rebuilding plan alternative. **MARFIN Award NA17FF2873**

D. Coastal Migratory Pelagic Fisheries

1. Population assessment of coastal migratory pelagics

a. "Discrimination among U.S. South Atlantic and Gulf of Mexico king mackerel stocks with otolith shape Analysis and otolith microchemistry"- the second year of a two year, $168,070 project to develop natural tags based on otolith microchemistry and shape analysis that will be used to estimate the relative contribution of each stock to the winter fishery off southeastern Florida and establish methods enabling annual estimation of stock mixing to facilitate more effective management of U.S. king mackerel stocks. **MARFIN Award NA17FF2013**

b. "Fishery and population characteristics of wahoo, *Acanthocybium solandri*, in Florida and adjacent waters of the western North Atlantic Ocean"- the second year of a three year, $182,701 project to summarize available fishery data for wahoo, complete a bag limit analysis, and synthesize new and published information about wahoo life history. Wahoo will be collected throughout the year from various fishing ports in Florida. Fish sizes will be related to sex and age and fecundity will be estimated from weighed sub-samples of oocytes in final maturation. **MARFIN Award NA17FF2882**

c. "Genetic analysis of wahoo, *Acanthocybium solandri*, stock structure in the western Atlantic and Gulf of Mexico by means of nuclear and mitochondrial DNA markers"- the second year of a two year, $165,276 project to resolve stock questions about wahoo utilizing seven demonstrated high resolution genetic makers. The direct results of this study will be a comprehensive genetic survey of wahoo encompassing its distribution and thereby provide one of the essential foundations for this species management. **MARFIN Award NA17FF2886**

E. Groundfish and Estuarine Fishes

1. Population assessment of groundfish and estuarine fishes

a. "Identifying spawning grounds and classifying nursery habitat for red drum *Sciaenops ocellatus* in Pamlico Sound, NC"- the second year of a two year, $324,295 project to delineate spawning grounds in select regions in Pamlico Sound and classify nursery grounds by determining whether there are unique microchemical signatures in the otoliths of juvenile red drum captured in habitats fringing Pamlico Sound. The project will determine if adults exploit both the river mouth and tidal pass inlet habitats for spawning and examine the microchemical characteristics of the otoloith core of young of the year red drum to identify the salinity of water at time of hatching. **MARFIN Award NA17FF2883**

b. "Red drum in South Carolina waters: The use of bottom longline gear to develop indices of relative abundance of adults in coastal and nearshore waters"- a one year, $75,679 project to use fishery independent longline sampling to develop catch per unit effort, size, sex, and age composition data and to tag adult red drum for the collection of migratory and stock identification data. The project will also tag and measure small sharks caught incidentally to red drum sampling for inclusion in the Cooperative Atlantic States Shark Pupping and Nursery Survey data base. **MARFIN Award NA17FF2884**

c. "Atlantic croaker, *Micropogonias undulatus*, along the middle Atlantic coast and southeast coast of the United States"- the second year of a three year, $223,732, project to obtain life history information, including abundance and distribution, on Atlantic croaker off the middle and south Atlantic states. The project will re-evaluate the interpretations of transverse sections of sagittal otoliths for age determination, calculate growth equations from size-at-age data, and generate cohort-specific indices of abundance. **MARFIN Award NA17FF2885**

F. Essential Fish Habitat

1. Develop geographic information systems (GIS) mapping protocols to allow the presentation of essential fish habitat (EFH) and habitat areas of particular concern (HAPC)

a. "GIS analysis of fishery-dependent data in relation to definition of essential fish habitat, habitat areas of particular concern, and marine protected areas in the South Atlantic Bight" - the second year of a two year, $193,786 project that will employ marine resources monitoring assessment and prediction program (MARMAP) fishery-independent trawl data to develop a GIS for the continental shelf and upper slope from Cape Hatteras, NC to West Palm Beach, FL. The GIS will examine historical and current databases for areas that might be considered Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas. **MARFIN Award NA17FF2874**

G. General

1. Economic Studies

a. "An intertemporal and spatially dynamic supply model of the Gulf of Mexico shrimp fleet for use in management and bycatch reduction"- the second year of a three-year, $287,233 project to develop defensible parameter estimates that can assist in explaining changes in the behavior of shrimp fishermen in relation to economic stimuli and/or potential management measures. The changes in the behavior of shrimp fishermen in response to economic stimuli and management measures will first be derived using microeconomic and economic considerations. These parameter estimates will then be used to develop a joint production function that will allow the examination of expected changes in bycatch in relation to changes in behavior of shrimp fishermen due to changes in economic stimuli or management measures. **MARFIN Award NA17FF2868**

b. "Economic valuation of marine reserves in the Florida Keys as measured by diver attitudes and preferences: Implications for valuation of non-consumptive use of marine resources"- the second year of a two-year, $87,723 project to determine the value of a non-consumptive activity, diving, on a marine reserve and to identify the factors that either enhance or reduce marine reserve value. The project will determine the monetary vale divers place on individual marine reserves in the Florida Keys and rank the attributes offered by the marine reserves that enhance diver visitation and satisfaction. **MARFIN Award NA17FF2869**

2. Participation Studies

a. "Factors affecting participation in marine fisheries: case studies in Georgia and North Carolina"- the second year of a two year, $129,221 project to identify factors in two counties (McIntosh, GA, and Brunswick, NC) that have motivated commercial fishers to leave the industry and recreational fishers to begin fishing for sport and leisure. Interviews will be conducted with a total of approximately 5,500 individuals during the two year project. **MARFIN Award NA17FF2877**

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(4) NMFS 2001. NMFS strategic plan for fisheries research. U.S. Dep. Commerce, NOAA, Natl. Mar. Fish. Serv., Silver Spring, MD, 88 p.

Appendix 1: MARFIN PANEL MEMBERS

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Appendix 1 (CON'T): MARFIN PANEL MEMBERS

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Appendix 3
Federal Funding Opportunity (FFO)
March 2004*

* The FFO is expected to be published by April 2004.

Appendix 4

MARFIN
Project
Summaries

NA17FF2009

MARFIN PROJECT SUMMARY

Project Title: Enhancing Industry Contribution Towards Documentation of Fishing Effort and Bycatch Reduction in the Shrimp Fishery of the Southeastern United States

Project Status/Duration: New_____ Con't__X__ Project Period: 12 Months

Name, Address, and Telephone Number of Applicant

Gulf & South Atlantic Fisheries Foundation, Inc.
Lincoln Center, Suite 740
5401 West Kennedy Blvd.
Tampa, FL 33609
Phone: (813) 286-8390 FAX: (813) 286-8261

Principal Investigator(s) and Brief Statement of Qualifications:
Ms. Judy L. Jamison - Over 21 years administrative and grants management experience
Dr. Tomas Vergel C. Jamir - Over 17 years fisheries/oceanographic research and project management experience

Project Objectives:
(a) Solicit and pre-screen as many industry, NMFS, State or internationally developed BRDs that show potential for use in the Gulf of Mexico and South Atlantic shrimp fishery;
(b) Conduct operational tests on approximately ten (10) promising BRDs following the official NMFS (Gulf of Mexico and South Atlantic Fishery Management Council) BRD Certification Testing Protocol;
(c) Collect field data on BRD certification tests using Foundation contracted (NMFS certified) fishery observers;
(d) Analyze and disseminate the results of tests to the commercial fishery, federal and state fishery management agencies, and Sea Grant/Marine Extension Service;
(e) Collect shrimp fishing effort, catch and corresponding rates of red snapper bycatch among commercial shrimp trawlers in the Gulf of Mexico; and
(f) Determine the red snapper bycatch and estimated fishing mortality (F) reduction potential of various experimental BRDs.

Specific Priority (ies) in Solicitation to Which Project Responds:
1. Bycatch (a) Shrimp trawl fisheries (1) Data collection and analyses to expand and update current bycatch estimates. (3) Identification, development and evaluation of gear fishing options to reduce bycatch.
2. Red Snapper Research (a) Red Snapper Bycatch (1) Shrimp trawl bycatch of red snapper.

Summary of Work: (For continuing projects, include progress to date)
The project will field test ten (10) promising industry bycatch reduction devices (BRDs) for certification following NMFS BRD Certification Testing Protocol for the South Atlantic and Gulf of Mexico. Included in the work plan are solicitation and review (with the Gear Review Panel) of industry ideas and prototype BRD designs for subsequent: (a) underwater hydrodynamic performance tests with NMFS-Pascagoula, (b) prototype BRD gear construction and tuning, and

(c) actual field certification testing aboard commercial shrimp trawls fishing within the U.S. Federal waters (i.e., Exclusive Economic Zone).

Data collection will be handled by Foundation contracted Fishery Observers, including data editing and entry by a contracted Data Manager into the NMFS-Galveston Bycatch Database. The Foundation's Program Director (Gear Technologist) will conduct the necessary statistical analysis for BRDs that met the "good tow" requirements, report write-up and presentation of results. Overall program administration will be handled by the Foundation's Executive Director. Bycatch reduction estimates will follow the procedures outlined in the protocol (modified paired t-test) including future revisions (e.g., proposed ratio analyses).

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$553,095			$553,095
Non-Federal				
Total	$553,095			$553,095

NA17FF2014

MARFIN PROJECT SUMMARY

Project Title: Genetic Impacts of Shrimp Trawling on Gulf Red Snapper

Project Status/Duration: New: _____ Con't: X Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Texas A&M Research Foundation
PO Box 3578
College Station, Texas 77843
Phone: (409) 845-8629

Principal Investigator(s) and Brief Statement of Qualifications:
John R. Gold, Ph.D.; Professor of Genetics; >25 years experience in fish molecular genetics with emphasis on population structure and use of molecular genetics in attaining management goals; experience on a variety of species, including red drum, spotted seatrout, king mackerel, greater amberjack, red grouper, bluefin tuna, and red snapper.

Project Objectives: Primary objectives are as follows: (a) provide scientific information critical to management of red snapper resources in the Gulf of Mexico; (b) assess potential genetic impacts on red snapper that stem from accidental mortality caused by shrimp trawling and which may reduce effective size of red snapper subpopulations thereby negatively impacting recruitment and long-term adaptive resilience; and (c) determine whether red snapper assemblages from five subregions (localities) across the northern Gulf are increasing or decreasing in genetic effective population size. In addition to providing a fishery-independent estimate of abundance of breeding adults, the last also provides a novel, genetics-based measure of stock or subpopulation structure.

Specific Priority(ies) in Solicitation to Which Project Responds:
Priority 1 - Bycatch: a.(2) status of fish stocks significantly impacted by shrimp trawler bycatch;
Priority 2 - Reef Fish: a.(3) recruitment of reef fish a.(4) stock structure of reef fish
Priority 3 - Red snapper: a.(1) shrimp trawl bycatch a.(2) directed red snapper fisheries

Summary of Work: (For continuing projects, include progress to date)
Work to be performed will include the following: (a) assay of allelic variation at 20 nuclear-encoded microsatellites from samples (75 - 100 age 0 fish) taken during shrimp trawling and representing five subregions (localities) in the northern Gulf; (b) determination of whether juveniles taken as bycatch represent random samples of genotypes within each subregional assemblage - multiple tests, including regression analysis of unbiased coefficients of genetic relatedness, will be employed to assess whether shrimp trawling could negatively impact red snapper genetic effective size; and (c) determination of whether red-snapper assemblages in the five subregional localities are increasing or decreasing in effective population size. The last will involve tests of the mutation-genetic drift equilibrium and will provide a genetics-based assessment of status and condition of subregional assemblages of red snapper in the northern Gulf. It also will address in a novel way the issue of subpopulation or stock structure of red snapper in the Gulf of Mexico.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 68,825			$ 68,825
Non-Federal	$ 13,312			$ 13,312
Total	$ 82,137			$ 82,137

NA17FF2031

MARFIN PROJECT SUMMARY

Project Title: Behavior and Swimming Performance of Red Snapper, *Lutjanus campechanus*: Its Application to Bycatch Reduction

Project Status/Duration: New ____ Con't X Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Glenn R. Parsons
Department of Biology
The University of Mississippi
Box 1848
University, MS 38677-1848
Phone: (662) 915-7479

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Glenn R. Parsons, Professor of Biology, 20 years experience in fish biology, Gulf of Mexico fishes, extensive research in fish swimming, published many papers on fish behavior and performance.

Project Objective: To assess the swimming ability and behavior of red snapper and apply this information to shrimp trawl bycatch reduction.

Specific Priority(ies) in Solicitation to which Project Responds: 1. Bycatch: Identification, development and evaluation of gear, non-gear and tactical fishing options to reduce bycatch.

Summary of Work: (For continuing projects, include progress to date)
In this proposal, we will investigate behavior and swimming in juvenile red snapper. Specifically, we will consider the effects of size, season, and time of day on red snapper behavior and swimming. In addition, we will evaluate a vortex generating BRD to assess its ability to reduce capture of juvenile snapper during shrimp trawl operations. This information may provide information essential to reducing red snapper bycatch and mortality.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 70,447	$ 70,650	$ 71,900	$212,997
Non-Federal	$ 57,960	$ 59,468	$ 59,653	$177,081
Total	$128,407	$130,118	$131,553	$390,078

NA17FF2867

MARFIN PROJECT SUMMARY

Project Title: Technology Transfer of New Turtle Excluder Device Modifications and Updated Bycatch Reduction Device Information to the Southeastern Shrimp Industry

Project Status/Duration: New _____ Con't X Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Gulf & South Atlantic Fisheries Foundation, Inc.
5401 W. Kennedy Boulevard, Suite 740
Tampa, FL 33609
Phone: (813) 286-8390

Principal Investigator(s) and Brief Statement of Qualifications:

Ms. Judy L. Jamison, Executive Director; 22 years grants administration experience
Mr. Geoffrey C. Lane, Program Director; 9 years in marine research/education

Project Objective: (a) Provide the shrimping industry with clear description of new TED regulations; (b) Provide information and assistance with newly mandated TED modifications; (c) Provide information of new BRD designs, status of prototype gears being tested, and assist individuals with problems they are encountering; and (d) Share experiences of fishermen with BRDs and TEDs in one are (both positive and negative) with industry members.

Specific Priority(ies) in Solicitation to which Project Responds:

(A) Bycatch (1) Shrimp Trawl Fisheries (d) Improved methods for communicating with and improving technology and information transfer to the shrimping industry; and (c) Red Snapper Research (a) Shrimp Trawl Bycatch of Red Snapper (1) Identification of gear to reduce bycatch of red snapper.

Summary of Work: (For continuing projects, include progress to date) This proposal involves the networking of gear specialists throughout the Southeast. Gear experts from the NMFS Harvesting Branch will collaborate with the Foundation/Sea Grant specialists to disseminate information on mandated TED changes and new BRD information. Meetings and workshops will be conducted from North Carolina to Texas. Comprehensive educational thrusts will be directed toward TED/BRD technology transfer through formal and informal workshops as well as individual, one-on-one assistance.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$171,000			$171,000
Non-Federal				
Total	$171,000			$171,000

NA17FF2010

MARFIN PROJECT SUMMARY

Project Title: Evaluation of the Efficacy of Current Minimum Size Regulations for Selected Reef Fish Based on Release Mortality and Fish Physiology

Project Status/Duration: New: _____ Con't: X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

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e-mail: Kburns@mote.org

Principal Investigator(s) and Brief Statement of Qualifications:
Karen M. Burns is the Principal Investigator of 8 (eight) successfully completed and 1 (one) recently awarded MARFIN project: as well as the Principal Invesitgator of MML's Reef Fish and Coastal Pelagic Tagging Program. She supervised a Master's thesis on red snapper survival in 1997.
Robin Overstreet has worked before with Karen Burns, on a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and in the South Atlantic, Award No. NA57FF0294. He directs the "Parasitology Department" at USM's College of Marine Sciences, which includes three graduate students, several technicians, and others. His program deals with red snapper and is part of a cooperative program with MML (NA006FL0501), as well as a USDA funded U.S. Marine Shrimp Farming Program (98-38808-6019).

Project Objectives: 1) To test the hypothesis that red grouper are more susceptible to death-induced mortality than red snapper based not only on swim bladder size and thickness, but also on the amount of bundles of rete mirabile and gas gland cells in the swimbladder; 2) To test the hypothesis that smaller red grouper (<12 in. [30.5 cm]) survive rapid decompression better than larger (>15 in. [38 cm]) red grouper because of changes in swimbladder structures with size (between 12 - 15 in. [30.5 - 38 cm]); 3) To obtain catch and release mortality rates relative to depth and gear for red grouper, gag, red snapper, vermilion snapper and mangrove snapper; 4) To obtain movement and migration patterns for red grouper, gag, red snapper, and mangrove snapper in the Gulf of Mexico and South Atlantic.

Specific Priority(ies) in Solicitation to Which Project Responds:

1. Bycatch
   c. Reef Fish fisheries
2. Reef Fish
   b. Population assessment of Reef Fish
      (2) Source and quantification of natural and human-induced mortalities. Including release mortality estimates etc.
      (6) Assessment of tag performance on Reef Fish species, primarily snappers and groupers, etc.

3. Red Snapper Research
   a. Red snapper bycatch
   b. Red snapper population
      (2) Estimates of red snapper abundance, age structure and population dynamics, etc. artificial structures

Summary of Work: (For continuing projects, include progress to date)

1. Collect red snapper and red grouper swimbladders over available size range especially 12 in. (30.5cm) - 15 in. (38cm) for histological analyses of the development of secretory structure.
2. Tag red grouper and red snapper especially 12 in. (30.5cm) - 15 in. (38cm) to evaluate survival from depth with development of swimbladder secretory structures.
3. Tag red grouper, red snapper, gag, mangrove, and vermilion snapper to obtain release mortality by depth and to obtain growth, movement, and migration data.
4. Double tag target species for tag shedding rates.
5. Evaluate circle hook captured red snapper survival by depth.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$167,481	$192,323		$359,804
Non-Federal	$ 66,211	$ 67,641		$133,852
Total	$233,692	$259,964		$493,656

NA17FF2012

MARFIN PROJECT SUMMARY

Project Title: Estimating Discard Rate and Release Mortality of Red Snapper in Texas Fisheries

Project Status/Duration: New: _____ Con't: X Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:
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Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Sandra Diamond has conducted research on bycatch issues, primarily in shrimp trawl and gill net fisheries, for over 15 years. In the mid-1980s, she ran the onboard observer program and participated as an observer in the pelagic drift net fishery in California. She is currently a member of the RFSAP and the SSC for the Gulf Council.
Dr. Quenton Dokken, co-PI, has over 20 years experience in the study and research of marine fish ecology and fisheries in Texas. Currently his work is focused on the ecosystem dynamics of natural and artificial reefs in the northwestern Gulf of Mexico and the socioeconomics of Texas fisheries. He has been the lead in working with offshore oil/gas producers to allow scientists to conduct marine research on platforms.

Project Objective: 1) To estimate delayed release mortality of red snapper under controlled conditions. 2) To find physiological indicators, of delayed release mortality using blood samples from caught fish. 3) To estimate discard rate and delayed release mortality in commercial and recreational fisheries using the indicators from the controlled study. 4) To tag released fish to estimate recapture rate by the fisheries. 5) To relate discard rate to year class strength using SEAMAP data.

Specific Priority(ies) in Solicitation to Which Project Responds:
1.a.(2), 1.c.(2), 1.c.(3), 2.b.(2), 2.c.(1), 3.a.(2)(b), and 3.d.(2) relate to estimating discard rate and discard mortality of red snapper relating observer estimates of release mortality to long-term survival, and evaluating the use of size limits as a management tool for red snapper.

Summary of Work: (For continuing projects, include progress to date)
Red snapper, the most economically important reef fish in the Gulf of Mexico, has been classified as over fished since 1984. Since then managers have regulated the directed fisheries using size and bag limits, closed seasons, and trip and seasonal quotas. The use of these measures assumes that either fishermen can avoid catching illegal fish or that catch-and-release does not contribute significantly to fishing mortality, but these assumptions may not be valid. We propose to conduct a study of release mortality under controlled field conditions to estimate the delayed release mortality with different capture depths and water temperatures using red snapper caught with hook and line and suspended from oil platforms, and to investigate the use of physiological indicators of

stress (plasma cortisol, lactate, and osmolality) to estimate delayed release mortality. We will also spend two years riding aboard commercial and recreational fishing boats to obtain better estimates of discard rates, to use the physiological indicators to estimate delayed release mortality in the field, and to conduct a tagging study to look at recapture rates over the season and between years. We will also look for a predictor of discard rate by relating discard rate in the fisheries to year class strength. If we can relate physiological measurements taken soon after capture to immediate and delayed release mortality, then we will be able to obtain much better estimates of release mortality to use in the stock assessment. Even if physiological indicators cannot be correlated with delayed release mortality, this study will provide data on discard rates and release mortality from the fisheries that can be used by the Gulf Council and NMFS to improve the red snapper stock assessment and help design management strategies to more effectively rebuild the overfished red snapper stock. If successful, these indicators may also be useful for other reef fish, such as red grouper.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$151,412	$ 99,027	$103,805	$354,244
Non-Federal				
Total	$151,412	$ 99,027	$103,805	$354,244

NA17FF2870

MARFIN PROJECT SUMMARY

Project Title: Validation of Ages for Species of the Deepwater Snapper/Grouper Complex Off the Coast of the Southeastern United States

Project Status/Duration: New _____ Con't X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Patrick J. Harris
Marine Resources Research Institute
PO Box 12559
Charleston, SC 29422-2559
Phone: (843) 953-9058

Principal Investigator(s) and Brief Statement of Qualifications:
Patrick J. Harris, Ph.D.; Associate Marine Scientist, SCDNR; experience with life history studies and project management

Project Objective: The primary goal of the proposed research is to validate increment counts from otolith sections of tilefish (*Lopholatilus chamaeleonticeps*), snowy grouper (*Epinephelus niveatus*), blackbelly rosefish (*Helicolenus dactylopterus*), blueline tilefish (*Caulotilus microps*) and wreckfish (*Polyprion americanus*) off the southeastern United States using accelerator mass spectrometry analysis of delta ^{14}C present in otoliths.

Specific Priority(ies) in Solicitation to which Project Responds: B. Reef Fish 1. Collection of basic biological data for species in commercially and recreationally important fisheries. (A) Age and growth of Reef fish. (2) Contributions to the development of annual age-length keys and description of age structures for exploited populations for all species in the complex addressed in the Reef fish and Snapper/Grouper Management Plans for the South Atlantic.

Summary of Work: (For continuing projects, include progress to date) Age and growth studies have been performed for a number of deepwater species in the snapper/grouper complex of the South Atlantic Bight. However, increments on these otoliths are typically extremely difficult to interpret, and most studies are published without any validation of the periodicity of increment formation. Validation of increment counts as an estimate of age is critical if any age-structured management is used for a species. Marginal increment analyses were performed for snowy grouper and blackbelly rosefish; however, the sample sizes used for each were rather low (248 for snowy grouper and 294 for blackbelly rosefish). No validation was attempted for the remaining three species. Radiocarbon has been utilized as a tool to validate the ages of long-lived species that were hatched during 1950-1970, when the activity of ^{14}C in the world's oceans doubled due to atmospheric testing of nuclear weapons. We will analyze thirty otolith sections each of tilefish (*Lopholatilus chamaeleonticeps*), snowy grouper (*Epinephelus niveatus*), blackbelly rosefish (*Helicolenus dactylopterus*), blueline tilefish (*Caulotilus microps*) and wreckfish (*Polyprion americanus*) obtained from an archive of otoliths maintained by MARMAP to validate ages obtained by counting increments from the same otoliths. By validating ages based on increment counts, this study will allow for species in this complex (many of which are over fished) to be managed using current age-structured models.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 27,848	$ 41,615		$ 69,463
Non-Federal				
Total	$ 27,848	$ 41,615		$ 69,463

NA17FF2007

MARFIN PROJECT SUMMARY

Project Title: Red Snapper *Lutjanus campechanus* in the Northern Gulf of Mexico: Age and Size Composition of the Commercial Harvest and Mortality of Regulatory Discards

Project Status/Duration: New _____ Con't X Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Office of Sponsored Programs
330 Thomas Boyd Hall
Louisiana State University
Baton Rouge, LA 70803-2701
Voice: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Charles A. Wilson and Mr. David L. Nieland, 21 years and 15 years experience, respectively, in age, growth, and reproductive biology of marine fishes in the northern Gulf of Mexico.

Project Objectives: For the red snapper commercial harvests in the northern GOM during 2001 - 2004: 1) determine the distribution of ages and lengths within these catches, 2) compare age and length distributions among harvest years and to previous studies, and 3) investigate both the catch and release mortality and the age composition of regulatory discards.

Specific Priority(ies) in Solicitation to Which Project responds: 2.a. (1)(a) - age and growth of RS; 2.a.(1) (b)- annual age-length keys for RS; 2.a. (1)(c) - production ageing of RS; 2.c.(3)- evaluation of impacts of management strategies; 3.a.(2)(b) - release mortality of RS in the commercial fishery; 3.b.(1) - annual age-length keys for RS; 3.b.(2) - production ageing of RS; 3.d. (1) - evaluation of impacts of management strategies.

Summary of Work: (For continuing projects, include progress to date)
Lengths and ages of red snapper randomly selected from the commercial fishery in the northern Gulf of Mexico will be used to describe the size and age composition of the harvest. Observers placed on commercial vessels will qualitatively assess release mortality of red snapper regulatory discards in the commercial fishery and collect undersized specimens for an examination of the age structure of same. All data will be furnished to the National Marine Fisheries Service for their use in periodic stock assessment efforts.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 88,050	$101,583	$108,383	$298,016
Non-Federal	$ 32,487	$ 34,769	$ 36,630	$103,886
Total	$120,537	$136,352	$145,013	$401,902

NA17FF2871

MARFIN PROJECT SUMMARY

Project Title: The Use of Lipofuscin for Aging Caribbean Spiny Lobster (*Panulirus argus*)

Project Status/Duration: New____ Con't__X__ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
Thomas R. Mathews
South Florida Regional Laboratory
Florida Marine Research Institute
2796 Overseas Highway
Marathon, FL 33050

Principal Investigator(s) and Brief Statement of Qualifications:
1. Thomas Matthews. The collection of specimens and rearing of known-age lobster will be coordinated by Matthews. Matthews has 12 years experience studying the ecology and management of the Caribbean spiny lobster.
2. Charles Derby. The quantification of lipofuscin in the eyestalks of *P. argus* will be performed in Derby's laboratory. Derby has 24 years experience studying the neurobiology and behavior of lobsters, and the last 20 years on the Caribbean spiny lobster *P. argus*.
3. Matt Sheehy is recognized as the world's expert on using the lipofuscin technique for aging crustaceans and has extensive experience in applying the results to fisheries management of commercially important Crustaceans in Europe and Australia.

Project Objective: There are two objectives to this project. The first is to make accurate determinations of the ages of lobster from the Florida Keys and Dry Tortugas to develop a complete growth curve and age-length key to understand the general growth parameters for use in fisheries management. Second, lobsters of known age (reared in the laboratory) will be used to calibrate the age-length key.

Specific Priority(ies) in Solicitation to which Project Responds: MARFIN identified the need to describe age and growth patterns for many fishery species including reef fish (B)(1a). Reef fish (1a) Age and growth. (2) Development of age-length keys), migratory fish (D(7) Develop age-length keys), ground/estuarine fishes (E(multiple references)). The need for information on the age and growth of the Caribbean spiny lobster is also critical as the resource approaches overexploitation or is already over exploited throughout its range (Cochrane and Chakalall 2001). This species is one of the most valuable commercial species in Florida and also supports a large recreational fishery.

Summary of Work: (For continuing projects, include progress to date) The goal of this proposal is to derive the age-structure of the Caribbean spiny lobster, *Panulirus argus*, population in the Florida Keys and in the Dry Tortugas fisheries. Understanding the age structure of this fishery species is critical. The identification of age-cohorts and the development of age-length key(s) will allow the determination growth rates, calculation of fishing mortality on specific year classes, development of recruitment indices, and allow the use of more powerful age-structured population analysis models to aid the successfully management of the spiny lobster fishery.

Quantification of lipofuscin, from histological examination of tissue, has proven to be the best predictor of age of many animals (Katz et al., 1984; Eldred and Lasky, 1993), including crustaceans. The regression of lipofuscin concentration vs. age is highly significant, unlike size vs. age. This has been demonstrated in European lobsters *Homarus gammarus*, suggesting that the lipofuscin content in the terminal medulla of the eyestalks can be quantified and used to estimate age of Caribbean spiny lobsters.

The first part of our proposal entails quantifying the lipofuscin content from a length-stratified sample of 240 lobster from the Florida Keys fishery and 300 lobsters from the Dry Tortugas fishery. From a length-stratified sample we can determine age cohorts using model analysis of a lipofuscin content frequency histogram and develop age-length keys. Second, we will calibrate the lipofuscin-model analysis using the lipofuscin content from lobster of known age, raised under laboratory conditions that duplicate natural conditions as closely as possible. Quantification of lipofuscin from known-age lobster will also allow development of generalized growth parameters for lobsters from the fishery.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 57,339	$ 57,942		$115,281
Non-Federal	$ 48,385	$ 44,274		$ 92,659
Total	$105,724	$102,216		$207,940

NA17FF2008

MARFIN PROJECT SUMMARY

Project Title: Stock Structure of Red Porgy, *Pagrus pagrus*, in the North Atlantic

Project Status/Duration: New _____ Con't___X__ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:
Dr. Amy O. Ball
Marine Resources Research Institute
SC Department of Natural Resources
PO Box 12559
Charleston, SC 29422-2559
Phone: (843) 953-9300
e-mail: ball@mrd.dnr.state.sc.us

Principal Investigator(s) and Brief Statement of Qualifications:
Amy O. Ball, Ph.D.; Research Biologist, SCDNR; extensive research experience with genetic stock identification and project management
George R. Sedberry, Ph.D.; Senior Marine Scientist, SCDNR; extensive fisheries and stock identification research; experience with project management
Robert W. Chapman, Ph.D.; Associate Marine Scientist, SCDNR; extensive molecular and population genetics experience; experience with project management

Project Objective: To determine stock identification in red porgy by examining variation in mtDNA and nuclear microsatellites. To define fishery management units based on genetic stock structure, life history characteristics, and jurisdiction. To determine the effects of fishing on the population, biology, and management of red porgy in the South Atlantic Bight and Gulf of Mexico.

Specific Priority(ies) in Solicitation to Which Project Responds:
Federal Register 66(36):11151. 2.a.(3) and 2.a(4); 2. Reef Fish. A. Collection of basic biological data for species in commercially and recreationally important fisheries. (3) Recruitment of Reef fish. (4) Stock structure of reef fishes.

Summary of Work: (For continuing projects, include progress to date)
The red porgy, *Pagrus pagrus,* is a protogynous sparid that is of commercial and recreational importance throughout its range. The species is found in the North and South Atlantic Oceans; however, it is unknown if there are separate stocks within the range. Off the southeastern United States (South Atlantic Bight, SAB), sustained heavy fishing pressure over two decades has resulted in a severely overfished population that has a smaller size at age, maturation (females), and sexual transition in the 1990's than during the late 1970's. This has resulted in closures of the fishery in the southeast Atlantic; however, the Gulf of Mexico fishery has not been subjected to such drastic measures and the stock appears to be in better condition in the Gulf. In the eastern Atlantic, red porgy populations have recently experienced a resurgence, with increased abundance and larger size. A year class of very large fish occurred in 1998 and this presumed year class had not been previously observed in the fishery. We propose to use molecular techniques to determine if there are distinct stocks of red porgy in the Gulf of Mexico and SAB, and to determine the

relationship of these stocks to the eastern North Atlantic and South Atlantic Ocean.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 83,544	$100,216	$ 96,332	$280,092
Non-Federal	$ 16,006	$ 16,006	$ 16,006	$ 48,016
Total	$ 99,550	$116,222	$112,338	$328,110

NA17FF2875

MARFIN PROJECT SUMMARY

Project Title: Stable Isotopes as Tracers of Patterns in Habitat Utilization by Juvenile Red Snapper

Project Status/Duration: New___ Con't__X___ Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

James H. Cowan, Jr.
Coastal Fisheries Institute
Louisiana State University
Baton Rouge, LA 70803-7503
Phone: (225) 578-9400

Principal Investigator(s) and Brief Statement of Qualifications:
James H. Cowan, Jr.: Has 15 years of experience conducting research on fish life history, trophic dynamics and bioenergetics.
Richard F. Shaw: Has 25 years of experience conducting research on recruitment issues concerning the early life stages of fishes.

Project Objective: The primary objective of this one-year study is to determine if juvenile red snapper tissues differ in isotopic composition at endpoints in their purported patterns of habitat utilization, i.e., between settlement from the plankton and later recruitment to reefs, due to associated dietary shifts in response to changes in habitat-specific food web structure.

Specific Priority(ies) in Solicitation to which Project Responds:
This work responds directly to priorities II.B.2(c), II.C.3(a) and II.C.3(b) in Federal Register Vol. 66, No. 199, October 15, 2001, pages 52390-52393.

Summary of Work: (For continuing projects, include progress to date) We propose to use stable isotopic composition of red snapper tissues as chemical tracers of food webe dynamics and dietary shifts. We infer that if different habitats on which juvenile red snapper are found provide differences in feeding opportunities, these differences should be detectable in their tissues. In this preliminary one-year study, we propose to collect juvenile red snapper from three primary habitats: open sand bottom, low-relief shell rubble reefs, and artificial reefs. We will determine if the stable isotopic composition of same-sized (age-0 or age-1) juvenile red snapper, as well as their gut contents, differ among these habitats, thus indicating habitat-specific dietary shifts in response to differences in food web structure.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 44,823			$ 44,823
Non-Federal	$ 32,103			$ 32,103
Total	$ 76,926			$ 76,926

NA17FF2876

MARFIN PROJECT SUMMARY

Project Title: Demographics, Density, and Seasonal Movement Patterns of Reef Fish in the Northeastern Gulf of Mexico Associated with Marine Reserves

Project Status/Duration: New _____ Con't _X_ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Florida State University
Office of Research
118 North Woodward Avenue
Tallahassee, FL 32306-4166
Phone: (850) 644-5260

Principal Investigator(s) and Brief Statement of Qualifications:
F. Coleman and C. Koenig have extensive knowledge of population ecology of reef fishes of the Gulf of Mexico. They were instrumental in having the marine protected areas in the northeastern Gulf of Mexico set aside as experimental areas for studying the potential of MPAs to be used as fisheries management tools. Their work on the biology and ecology of reef fishes has long served as the basis for important management decisions in both the Gulf of Mexico and the South Atlantic.

Project Objective:
To locate historical fishing sites within and outside the northeastern Gulf of Mexico fishery reserves with the aid of commercial fishers.
To determine the age structure, movement patterns and rates, and sex ratios of all economically important species sampled from study sites using conventional dart and internal anchor tags and non-injurious biopsy methods.
To determine movement patterns and seasonal habitat associations of selected economically import species sampled from study sites using ultrasonic tags.
To census fish populations with ROV on the selected sites within and outside the fishery reserves to determine density (mark-resight methods), size structure (laser systems), and sex ratio of sexually dimorphic species.
To compare the demographic, census, and movement patterns of economically important reef fish between years to evaluate interannual variation.
To evaluate the significance of the seasonal winter closure of the grouper fishery.

Specific Priority(ies) in Solicitation to which Project Responds:
3. Reef fish fisheries (B) Reef Fish: age and growth (1a1), (1a2); reproduction (1b1), (1b3), (1b4), (1b5); recruitment (1c1), (1c2); Stock structure (1d1), (1d3). Population assessment (2a), (2e), (2f) Management (3a), (3b), (3c). Red Snapper (c): Biological information (2a), reproduction (2c1), (2c2), recruitment sources (2d), population assessment (3a), (3b). EFH (F2), (F3).

Summary of Work: (For continuing projects, include progress to date) The overall goal of the proposed research is to characterize the density, movement patterns, and demographic patterns for all fishery species (including gag, scamp, red grouper, red snapper, vermilion snapper, and

amberjack) associated with the Madison-Swanson and Steamboat Lumps Fishery Reserves on the eastern Gulf of Mexico shelf edge. These characteristics and patterns will be studied within the reserves as well as in reference sites outside of the reserve over a two year period, thus allowing comparisons both spatially and temporally of fishing effects on these characteristics. We will also evaluate the effects of the seasonal grouper fishery closure on the demographics, movement patterns, and associations among reef fish species.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$196,000	$177,531		$373,531
Non-Federal				
Total	$196,000	$177,531		$373,531

NA17FF2878

MARFIN PROJECT SUMMARY

Project Title: Can Marine Protected Areas Conserve Genetic Diversity in Tomtate, Haemulon Aurolineatum, and French Grunt, H. Flavolineatum?

Project Status/Duration: New____ Con't__X__ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:
Robert W. Chapman
SC Department of Natural Resources
217 Ft. Johnson Road
Charleston, SC 29412
Phone: (843) 953-9071

Principal Investigator(s) and Brief Statement of Qualifications:
R. W. Chapman, extensive experience in genetic analysis of reef species
G. R. Sedberry, extensive experience in reef fish biology and ecology
B. Luckhurst, extensive experience in reef fish biology and management

Project Objective:
1. Assess levels of genetic variation within and among populations of tomtate and French grunt in the western Atlantic using mitochondrial and nuclear DNA loci.
2. Determine levels of genetic exchange among populations using standard population genetics tools.
3. Evaluate the degree of population isolation in light of the requirements of current ecological models evaluating the impact of MPAs.

Specific Priority(ies) in Solicitation to which Project Responds: B. Reef fish 3b. Evaluation of the use of marine reserves as an alternative or supplement to current fishery management practices and measures for reef fish.

Summary of Work: (For continuing projects, include progress to date) In this proposal we outline a program of research aimed at examining the level of genetic differentiation among populations of tomtate and French grunt in the southeastern US, the Gulf of Mexico, Trinidad, the Caribbean and Bermuda. The effective number of migrants per generation will be estimated based upon molecular data as a means of evaluation dispersal and thus potential benefits of MPAs, with respect to these species and the ecosystems in which they reside. The effort is not aimed at a complete survey of these species throughout their range. Rather we propose to assess the levels of genetic exchange among these areas and relate these findings to current model predictions on the benefits of MPAs. We have selected tomtate and French grunt because they are abundant members of hard bottom communities along the southeastern US, substantial research has shown their ecological importance to these systems, and they are related to white grunt (H. Plumieri) and, thus, may demonstrate a similar pattern differentiation.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 93,000	$103,242	$ 85,647	$281,889
Non-Federal	$ 16,120	$ 16,120	$ 16,120	$ 48,360
Total	$109,120	$119,362	$101,767	$330,249

NA17FF2879

MARFIN PROJECT SUMMARY

Project Title: An Economic Analysis of Fleet Dynamics in the Gulf of Mexico Grouper Fishery

Project Status/Duration: New_____ Con't __X__ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Board of Supervisors
Louisiana State University & Agricultural and Mechanical College
Office of Sponsored Programs
330 Thomas Boyd Hall
Baton Rouge, LA 70803-2701
Phone: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Walter R. Keithly, Jr., Associate Professor, School of the Coast & Environment
Dr. Richard Kazmierczak, Jr., Associate Professor, Department of Agricultural Economics

Project Objective: The overall goal of this project is to provide a better understanding of grouper fishermen behavior under varying economic and regulatory conditions. To this end, objectives include: (1) analysis of those factors influencing gear choice, (2) development and estimation of a defensible economic model that explains observed behavior of Gulf of Mexico grouper vessels, and (3) analysis of the impacts of alternative management policies on grouper harvests and production technology.

Specific Priority(ies) in Solicitation to which Project Responds:
B.3.(a) Management of reef fish (research in direct support if management)

Summary of Work: (For continuing projects, include progress to date) National Marine Fisheries Reef Fish Log Book data, augmented with appropriate costs data, will be used to develop and estimate a defensible economic model depicting behavior of Gulf of Mexico grouper fishermen. The economic models will be derived using microeconomic and econometric conditions. Results from this exercise will be used to forecast the impacts associated with specific proposed management options.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$102,975	$106,005		$208,980
Non-Federal	$ 35,420	$ 35,638		$ 71,058
Total	$138,395	$141,643		$280,038

NA17FF2015

MARFIN PROJECT SUMMARY

Project Title: Marine Reserve Effectiveness in Restoring Coastal Food Webs: An Experimental Test using the Special Protection Areas and an Ecological Reserve in the Florida Keys National Marine Sanctuary

Project Status/Duration: New: ____ Con't: X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Dauphin Island Sea Lab/Marine Environmental Sciences Consortium
101 Bienville Boulevard
Dauphin Island, AL 36528
Phone: (251) 861-2141

Principal Investigator(s) and Brief Statement of Qualifications:

John F. Valentine - Current investigations focus on the role of biotic processes in controlling the flow of energy among trophic levels in marine habitats, particularly herbivory on seagrasses; the application of conservation techniques for the protection of near shore marine ecosystems; the use of marine protected areas to test the impacts of higher order consumers on the strength of trophic linkages between seagrass and coral reef habitats.

Project Objective: To inform scientists, managers and conservationists about the importance of linkages among habitats and landscape-scale considerations in the design of tropical marine reserves.

Specific Priority(ies) in Solicitation to Which Project Responds:

Section 8.c.2. Evaluation of the use of marine reserves as an alternative or supplement to current fishery management practices and measures for reef fish.

Summary of Work: (For continuing projects, include progress to date)

Scientists and conservationists alike are increasingly concerned that the harvesting of large predatory fishes has caused significant alterations in the structure and function of marine ecosystems. Marine reserves are being used as a tool to address this problem, but there has been little examination of: (i) how fishing has altered food webs on reefs and adjacent habitats or (ii) how landscape-scale considerations should be included in the design of reserves. In addition, most reserves are small, unreplicated, designed around just one habitat type (usually a coral reef), and studies of marine reserves overlook the connectivity between coral reef and adjacent seagrass habitats, as well as the importance of reef structural complexity and geometry on the re-establishment of large predators. We propose to take advantage of the rare opportunity to use replicated "no-take" (predator rich) and unprotected (predator poor) reefs in the Florida Keys National Marine Sanctuary to assess the impact of large piscivorous fishes on food web structure in and around the coral reefs, the importance of linkages among seagrass and coral reefs in the re-establishment of these food webs, and the effects of habitat structure (complexity and fragmentation of reefs) on the success of marine reserves.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 86,644	$ 96,934		$183,578
Non-Federal	$ 41,214	$ 43,388		$ 84,602
Total	$127,858	$140,322		$268,180

NA17FF2881

MARFIN PROJECT SUMMARY

Project Title: Geographic Comparison of Age, Growth, Reproduction, Movement and Survival of Red Snapper Off the State of Florida

Project Status/Duration: New_____ Con't__X___ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Karen M. Burns
Program Manager Fisheries Biology Program
Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 34236
Phone: (941) 388-4441

Principal Investigator(s) and Brief Statement of Qualifications:

Karen M. Burns is the Principal Investigator of nine (9) successfully completed, one (1) on-going and one (1) recently awarded MARFIN projects.

Nancy Brown-Peterson has worked with both Karen Burns and Robin Overstreet on the reproductive biology portion of a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and South Atlantic (award No. NA57FF0294). She has 20 years experience with histology and reproductive biology and has supervised and helped teach undergraduate and graduate students histological techniques and slide interpretation.

Robin Overstreet, Ph.D. has worked before with Karen Burns, on a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and in the South Atlantic, Award Number NA57FF0294. He directs the "Parasitology Department" at USM's College of Marine Sciences, which includes three graduate students, several technicians, and others. His program deals with red snapper and is part of a cooperative program with MML (NA006FL0501), as well as a USDA funded U.S. Marine Shrimp Farming Program (98-38808-6019).

Project Objective:

1. To test the hypothesis that red snapper will survive depth induced mortality
2. To obtain life history information including age and growth and reproductive data for red snapper off the southwest and northeast coast of Florida and compare these data with those from the northern Gulf of Mexico
3. To test the hypothesis that circle hooks will greatly reduce release mortality in red snapper
4. To obtain catch and release mortality rates relative to depth and gear for red snapper
5. To determine tag shedding rates and effects on growth and survival for fish tagged with single barbed dart tags in red snapper
6. To obtain movement and migration patterns for red snapper in the Gulf of Mexico and South Atlantic
7. To monitor the movement patterns of wild red snapper as compared to those obtained by Gulf of Mexico Marine Stock Enhancement Program (GMSEP) for cultured red snapper stocked off Southwest Florida

Specific Priority(ies) in Solicitation to which Project Responds:

A. Bycatch

3. Reef fish fisheries. (b) Characterization and assessment of the impact of bycatch of undersized target species, including release mortality, during...etc. (c) Determination of the release mortality by depth of red snapper caught on commercial bandit rigs that are...etc.

B. Reef Fish

1. Collection of basic biological data for species in commercially and recreationally important fisheries. (a) Age and growth of reef fish. (1) Description of age and growth patterns, especially for red...etc. (d) Stock structure of reef fish. (1) Movement and migration patterns of commercially and recreationally valuable reef fish species...etc.

2. Population assessment of Reef fish. (b) Source and quantification of natural and human-induced mortalities, including release mortality estimates for charter boats,...etc. (f) Assessment of tag performance on Reef fish species, primarily snappers and groupers. Characteristics examined should...etc.

C. Red Snapper Research

1. Red snapper bycatch. The bycatch of red snapper can have significant impacts from a fisheries management and ecological...etc. (b) Directed red snapper fisheries. (1) Development and evaluation of gear and fishing tactics to minimize the bycatch...etc. (2) Characterization and assessment of the impact of bycatch of undersized reef fish species...etc.

2. Red snapper biological information. (d) Identification of sources of recruitment of red snapper in Gulf waters.

4. Management of red snapper (a) Characterization and evaluation of biological impacts...etc. (b) Research to evaluate the use of minimum size limits....etc.

Summary of Work: (For continuing projects, include progress to date)

1. Collect red snapper otoliths and gonads over available size range for age/growth and reproductive studies.
2. Tag red snapper from the northeast and southwest coast of Florida and the northern Gulf of Mexico to evaluate survival from depth by gear type.
3. Tag red grouper, red snapper, gag, mangrove, and vermilion snapper to obtain release mortality by depth and to obtain release mortality by depth and to obtain release mortality by depth and to obtain growth, movement and migration data.
4. Double tag red snapper for tag shedding rates.
5. Evaluate circle hook captured red snapper survival by depth and gear type.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$197,633	$206,143	$219,385	$623,161
Non-Federal	$ 64,629	$ 67,636	$ 69,787	$202,052
Total	$262,262	$273,779	$289,172	$825,213

NA17FF2872

MARFIN PROJECT SUMMARY

Project Title: Assessment of Bathymetric Highs as Nursery Habitat of Newly Settled Red Snapper

Project Status/Duration: New _____ Con't X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
Texas A&M Research Foundation
3578 TAMU
College Station, TX 77843
Phone: (979) 845-3806

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Jay Rooker, Assistant Professor, Expertise and Research Interests: Fisheries Ecology, Post-recruitment processes, Analytical approaches to fish demography
Dr. Andre Landry, Professor, Expertise and Research Interests: Sea Turtle and Fisheries Ecology
Dr. Tim Dellapenna, Assistant Professor, Expertise and Research Interests: Marine Geology, Active acoustics

Project Objective: The proposed study will characterize bathymetric highs on the inner continental shelf in the NW Gulf of Mexico and evaluate the importance of these complex habitats as nursery grounds of red snapper.

Specific Priority(ies) in Solicitation to which Project Responds: The proposed responce to several MARFIN funding priorities listed in the Federal Register under Section 3 on red snapper research: 1) identification of sources of red snapper recruits in Gulf waters, 2) improve the understanding of factors affecting recruitment success, 3) identification of tactical fishing options to reduce bycatch of red snapper, and 4) determination of the habitat and limiting factors for important red snapper populations in the Gulf.

Summary of Work: (For continuing projects, include progress to date) This proposed research builds on a previously funded Marine Fisheries Initiative project. One year of support (MARFIN grant NA97FF0346) was obtained to determine spatial and temporal patterns of habitat use on a well-developed ridge system off Freeport, Texas. Results from the first year demonstrated that ridge and interface habitats represent important nursery areas for red snapper. The proposed research represents the next logical step in evaluating the importance of bathymetric highs as nursery habitat of red snapper. Several complementary approaches will be used to characterize environmental and habitat variables at several bathymetric highs in the NW Gulf of Mexico. The primary aim of the new work is to: 1) expand the scope of the previous study and assess the importance of other bathymetric highs to early life history of red snapper in the NW Gulf, 2) couple active acoustic surveys with trawling data to provide fine-scale resolution of habitat utilization by new recruits, 3) combine estimates of growth and abundance to predict the recruitment potential of recruits from different bathymetric highs as well as different habitat types (ridge, interface, mud) within a system. Finding from the proposed work will be used to delineate essential nursery habitat of red snapper and assess the utility of habitat-based management

strategies such as time and area closures. Moreover, bathymetric highs are currently being targeted as sources of sand for beach replenishment projects and thus results may aid in the protection and conservation of putative nurseries of red snapper that are in jeopardy of being compromised or lost entirely.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$105,324	$106,145		$211,469
Non-Federal	$ 25,273	$ 25,408		$ 50,681
Total	$130,597	$131,553		$262,150

NA17FF2880

MARFIN PROJECT SUMMARY

Project Title: Development of Assays for Major Histocompatibility Complex (MHC) Class I and Class II Loci in Gulf Red Snapper for Use in Stock Structure Analysis and Assessment of Genetic Health

Project Status/Duration: New _____ Con't X Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Texas Agricultural Experiment Station
2147 TAMU
College Station, TX 77843-2147
Phone: (979) 845-4761

Principal Investigator(s) and Brief Statement of Qualifications:
John R. Gold, Ph.D.; Professor of Genetics; >25 years experience in fish molecular genetics with emphasis on population structure and use of molecular genetics in attaining management goals; experience on a variety of species, including red drum, spotted seatrout, king mackerel, greater amberjack, red grouper, bluefin tuna, and red snapper.

Project Objective: The short-term objective of the project is to develop polymerase chain reaction (PCR) primers that optimize identification (discrimination) of orthologous from paralogous major histocompatibility complex (MHC) genes (loci) in Gulf red snapper. The long-term objective is to use the genetic tools developed in studies of stock structure and immune response capability of individuals/stocks to resist parasites, pathogens, and other cytotoxic challenge. The ultimate goal of the research is to provide information critical to the wise and effective management and conservation of red snapper resources in U.S. waters. Genetic markers to be developed also will be vital to stock enhancement of red snapper resources, should this become a necessity in the future.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red Snapper Research. The specific priority to which proposed activities respond is 'Red Snapper Research' (although other priorities, including 'Bycatch' and 'Reef Fish' would be impacted). Specific sub-priorities include: (i) red snapper biological information, (ii) red snapper population assessment, and (iii) stock structure of reef fish.

Summary of Work: (For continuing projects, include progress to date) (i) Clone and sequence fragments of red snapper major histocompatibility complex (MHC) class I and class II loci generated by PCR amplification. (ii) Approximate whether fragments (alleles) represent orthologous or paralogous MHC loci through phylogenetic analysis of coding (exon) regions. (iii) Design and Test specific PCR primer sets that amplify alleles at identified MHC loci of red snapper. (iv) Test Mendelian segregation in F_1 individuals to determine whether individual MHC alleles represent orthologous or paralogous loci. (v) Prepare semi-annual land annual reports for NMFS and the MARFIN Program Board.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 34,350			$ 34,350
Non-Federal	$ 7,690			$ 7,690
Total	$ 42,040			$ 42,040

NA17FF2865

MARFIN PROJECT SUMMARY

Project Title: Linking Spatial-Temporal Population Size Structures and Fishing Effort Dynamics to Assess the Effectiveness of Minimum Size for Red Snapper Management

Project Status/Duration: New _____ Con't X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
University of Miami
Rosenstiel School of Marine and Atmospheric Science
4600 Rickenbacker Causeway
Miami, FL 33149
Phone: (305) 361-4741

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Nelson Ehrhardt. Population dynamics and stock assessment modeling, fishery management science and quantitative methods applied to fishery analysis. MSc. In Fisheries and Ph.D. in Marine Population Dynamics and Economics
Dr. David Die. Research Associate Professor. Fishery management and fish stock assessment. Extensive and current experience in red snapper assessments and red snapper ecology

Project Objective: 1) Develop a size structured spatial yield-per-recruit model to assess minimum size options for red snapper. 2) Compile temporal-spatial databases of red snapper population size structures and fishing effort. 3) Risk assessment research on effectiveness of minimum size implementation as an effective management tool for recuperating the Gulf of Mexico red snapper fishery.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red snapper research. 4. Management of red snapper, (b) Research to evaluate the use of minimum size limits as management tool in the red snapper fishery and (a) Characterization and evaluation of biological impacts (e.g., changes in age or size structure of red snapper populations in response to management strategies).

Summary of Work: (For continuing projects, include progress to date) We propose to fully develop a state-of-art size-structures yield-per-recruit model to use it in an assessment of the effectiveness of minimum size as a viable red snapper management option. Risk assessments will be performed with the new model by using probability distributions regarding the uncertainty of key components of the framework. The spatial population size distribution and abundance will be expressed as transitional probabilities in a stochastic migratory model while effort allocation will follow contagious fish population abundance conditions according to spatial distributions of the stock. The effects of age distributions at minimum size will be integrated as probability distribution as well, hence, portraying the most likely impact of minimum size and the associated spatial catch release survivorship on the size and age structure of the stock. The risk platform will be stated as the probability that the designed minimum size will not achieve the desired outcome under the fishery management strategy. The effects of such risks will also be evaluated regarding reference point estimation used in red snapper stock assessments.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 83,434	$ 87,709		$171,143
Non-Federal	$ 17,354	$ 18,243		$ 35,597
Total	$100,788	$105,952		$206,740

NA17FF2873

MARFIN PROJECT SUMMARY

Project Title: Bioeconomic Analysis of the Red Snapper Rebuilding Plan and Transferable Rights Policies in the Gulf of Mexico

Project Status/Duration: New _____ Con't__X___ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
Wade L. Griffin
Department of Agricultural Economics
Texas A&M University
College Station, TX 77843-2124
Phone: (979) 845-4291

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Wade L. Griffin possesses a wealth of experience relative to this project. Griffin has completed twenty-five projects related to the Gulf of Mexico some of which include real effort measurement, Texas closure, TEDs, and finfish bycatch.
Dr. Richard Woodward is an expert in the area of dynamic optimization and sustainability. He has conducted analysis on resource management issues including fisheries, forestry, and global warming.

Project Objective: The principal objective of this project is to improve upon existing bioeconomic analyses of the proposed red snapper rebuilding plan through 2032 by including three important issues that have not received adequate attention to date.
1. Include in the bioeconomic model, the for-hire recreational red snapper fishery.
2. Explore the impact of red snapper policies on other reef fish fisheries, particularly vermilion snapper.
3. Study the possible use of transferable rights in the red snapper recreational and commercial fisheries.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red Snapper Research.
4. Management of Red Snapper.

Summary of Work: (For continuing projects, include progress to date)
Year 1: During the first year of the project, we will modify the General Bioeconomic Fisheries Simulation Model (GBFSM) to include the following five vessel classes: commercial red snapper vessels with 2000 pound endorsement and with 200 pound endorsement; recreational red snapper vessels of party boats, charter boats and private boats. The model will be calibrated to the most recent commercial and recreational data for shrimp, red snapper, and vermilion snapper. We will then conduct preliminary analyses of the proposed red snapper rebuilding plan alternatives (as proposed in the "Regulatory Amendment to the Reef Fish Fishery Management Plan to Set a Red Snapper Rebuilding Plan through 2032").

Year 2: During the second year of the project we will conduct preliminary analyses using the model, to analyze the impact of red snapper policies on vermilion snapper. After consultations

with the NMFS economists, modifications in the model and/or policies examined will be made. In addition, we will begin to develop the submodel to simulate transferable rights programs for the commercial, for-hire recreational, and private recreational sectors of the red snapper fishery. *Finally,* we will complete the specification of GBFSM to include a transferable rights program and compare the economic and biological impacts of this program with the policies proposed in the Red Snapper Rebuilding Plan.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 57,999	$ 64,320		$122,319
Non-Federal	$ 33,856	$ 35,590		$ 69,446
Total	$ 91,855	$ 99,910		$191,765

NA17FF2013

MARFIN PROJECT SUMMARY

Project Title: Discrimination Among U.S. South Atlantic and Gulf of Mexico King Mackerel Stocks with Otolith Shape Analysis and Otolith Microchemistry

Project Status/Duration: New_____ Con't__X__ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

University of South Alabama
Department of Marine Sciences
Life Sciences Building 25
Mobile, AL 36688
Phone: (334) 861-7316

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. Robert Shipp - 35 years experience with research on systematics, age and growth, fisheries ecology, and fisheries management of numerous fish species. Co-Principal Investigator: Dr. William Patterson (Post-Doctoral Scientist) - 10 years experience with research on age and growth, population dynamics, fisheries ecology, and otolith microchemistry

Project Objective: This interdisciplinary, interstate effort expands on our previous investigations of king mackerel stock structure and mixing rates. The central goal of the project is to provide scientific information critical to the effective management and conservation of U.S. South Atlantic and Gulf of Mexico king mackerel stocks. The primary objective is to develop natural tags based on otolith microchemistry and shape analyses that will: 1) be employed to estimate the relative contribution of each stock to the winter fishery off southeastern Florida, as well as region-specific mixing proportions around peninsular Florida in winter; and 2) establish methods enabling annual estimation of stock mixing to facilitate more effective management of U.S. king mackerel stocks.

Specific Priority(ies) in Solicitation to which Project Responds: 1. A. (2) assessment of fish stocks significantly impacted by shrimp trawler bycatch; 4. e. information on populations of coastal pelagics overwintering off North Carolina, South Carolina, Georgia, and Florida, especially concerning population size, age and movement patterns. Calculate the mixing rates for Atlantic/Gulf king mackerel on an annual basis.

Summary of Work: (For continuing projects, include progress to date) For U.S. South Atlantic and Gulf of Mexico king mackerel, we will: 1) determine natural tags based on otolith shape and microchemistry analyses of each stock in summer when stocks are separate; 2) estimate the relative contribution of each stock to the winter mixed fishery in south Florida based on stock-specific tags developed from otolith shape and microchemistry analyses; 3) estimate the region specific mixing proportions of each stock around peninsular Florida in winter with otolith shape and microchemistry analyses; and 4) compare results obtained from otolith shape and microchemistry analysis methods to determine which technique is most powerful and/or cost effective. All work will be accomplished by PI Shipp, Co-PI Patterson, a master's level graduate, an undergraduate student worker. Additionally, Research Fishery Biologists at the Panama City, Florida, NMFS laboratory will contribute to the project by facilitating collection of otolith samples,

aiding in estimating ages of otolith samples, and in development of otolith shape analysis protocols.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 78,398	$ 89,672		$168,070
Non-Federal	$ 6,359	$ 6,359		$ 12,718
Total	$ 84,757	$ 96,031		$180,788

NA17FF2882

MARFIN PROJECT SUMMARY

Project Title: Fishery and Population Characteristics of Wahoo, *Acanthocybium solandri*, in Florida and Adjacent Waters of the Western North Atlantic Ocean

Project Status/Duration: New_____ Con't__X__ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:
Florida Marine Research Institute
100 Eighth Avenue Southeast
St. Petersburg, FL 33701
Phone: (727) 896-8626

Principal Investigator(s) and Brief Statement of Qualifications:
Richard S. McBride (Ph.D.) and Michael D. Murphy (M.S.)
30-plus combined years of research experience; 30-plus peer-review publications on fish biology, life history, fishery research

Project Objective: This proposed research will: 1) characterize the landings, effort, and value of Florida's wahoo fishery; 2) assess impacts of bag limits on total catch and landings of wahoo; 3) produce age-length keys and growth models for wahoo using validated aging methods; 4) describe wahoo size and age at maturity and spawning seasonality; 5) estimate wahoo fecundity and spawning frequency; and 6) synthesize Florida's fisheries information and life history parameters with other regions in the western North Atlantic, Caribbean Sea, and Gulf of Mexico.

Specific Priority(ies) in Solicitation to which Project Responds: D. coastal Migratory Pelagic Fisheries: to examine 'basic biostatistics for .... wahoo to develop age-length keys and maturation schedules for stock assessments and to evaluate stock structures' and 'impacts of bag limits on total catch and landings of .... wahoo.'

Summary of Work: (For continuing projects, include progress to date) In this new project, we will summarize the available fishery data for wahoo, complete a bag limit analysis, and synthesize new and published information about wahoo life history. The fishery databases to be examined are: the Florida Marine Fisheries Information System, the Trip Interview Program, and the Marine Recreational Fisheries Statistics Survey. Wahoo will be collected throughout the year from various fishing ports along Florida's east coast. Fish sizes will be related to fish sex and age, to investigate growth patterns and longevity. Various aging methods will be screened and the most successful will be used for routing aging. Fecundity will be estimated from weighed sub-samples of oocytes in final maturation, and spawning frequency will be estimated from post-ovulatory follicles observed in histological preparations. Reproductive seasonality and size/age at maturity will be characterized from gonad-somatic indices and patterns of gametogenesis revealed in histological preparations.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 57,056	$ 61,278	$ 64,367	$182,701
Non-Federal	$ 16,429	$ 16,488	$ 16,780	$ 49,697
Total	$ 73,485	$ 77,766	$ 81,147	$232,398

NA17FF2886

MARFIN PROJECT SUMMARY

Project Title: Genetic Analysis of Wahoo, *Acanthocybium solandri*, Stock Structure in the Western Atlantic and Gulf of Mexico by Means of Nuclear and Mitochondrial DNA markers

Project Status/Duration: New_____ Con't__X__ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
Dr. John D. Baldwin
Division of Biological Sciences
Florida Atlantic University
2912 College Avenue
Davie, Fl 33314
Phone: (954) 236-1151

Principal Investigator(s) and Brief Statement of Qualifications:
John D. Baldwin, Ph.D., Division of Biological Sciences, Florida Atlantic University.
Reproduction and population genetics of aquatic organisms
Brian W. Bowen, Ph.D., Department of Fisheries and Aquatic Sciences, University of Florida.
Conservation genetics of aquatic organisms

Project Objective: The goal for this project is to resolve stocks of wahoo, *Acanthocybium solandri*, along the Atlantic coast, Gulf of Mexico, Bahamas, and greater Caribbean utilizing seven demonstrated high resolution genetic markers; mitochondrial DNA (mtDNA) sequence data, RFLP analysis of two nDNA loci, and microsatellite analysis of four hypervariable nDNA loci.

Specific Priority(ies) in Solicitation to which Project Responds: This research proposal addresses Project Funding Priority D "Coastal Migratory Pelagic Fisheries." Specifically, this proposal addresses current high priorities 1), 5), and 7).

Summary of Work: (For continuing projects, include progress to date) There is surprisingly little scientific information on the biology of *A. solandri*. Like other members of the family Scombridae, which includes the mackerels and tunas, wahoo inhabit tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. The proposed research plan is a test of stock structure in wahoo of the western North Atlantic, including multiple sample locations on the Atlantic coast of the southeast U.S., the Gulf of Mexico, adjacent sites in the Bahamas, West Indies, and the Caribbean coast of Central America. Tissue samples will be collected for stock resolution utilizing high-resolution genetic markers, and pertinent biological data (including standard size measurements, weight, and sex) will be documented. Population genetic data will include mtDNA cytochrome b gene sequences, RFLP analysis of two nDNA loci, and microsatellite analysis of four nDNA loci. These approaches have previously proven successful for resolving stock structure in other members of the suborder Scombroidei and Teleostei such as mackerels, tunas, and billfishes. Our preliminary studies demonstrate that all seven loci will provide an appropriate level of resolution for defining stock structure in wahoo. Recent advances in the application of such data to derivation of spatial geography, population structure, and management guidelines will be applied to examine the relationships among *A. solandri* populations.

We will analyze data from all *A. solandri* samples collected during the project with an analysis of molecular variance, an exact test of population structure, several models for assessing migration rates among populations, and standard indices of genetic diversity. The direct results of our proposed research will include a comprehensive genetic survey of *A. solandri* encompassing its distribution in the western Atlantic and Gulf of Mexico thereby providing one of the essential foundations for wahoo management. These data will be appropriate for integration with results from other researchers and agencies and serve to refine those models for management plans by the appropriate agencies.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 91,000	$ 74,276		$165,276
Non-Federal				
Total	$ 91,000	$ 74,276		$165,276

NA17FF2883

MARFIN PROJECT SUMMARY

Project Title: Identifying Spawning Grounds and Classifying Nursery Habitat for Red Drum *Sciaenops ocellatus* in Pamlico Sound, NC

Project Status/Duration: New_____ Con't__X___ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
Dr. Peter S. Rand
115 David Clark Labs
Department of Zoology
NC State University
Raleigh, NC 27695-7617

Principal Investigator(s) and Brief Statement of Qualifications:
Peter S. Rand, Ph.D., Fisheries Science; Cynthia M. Jones, Ph.D., Fisheries Science

Project Objective: We propose to investigate two inter-related areas of research to improve our understanding of red drum, *Sciaenops ocellatus*, life history patterns in coastal North Carolina. Specifically we intend to: 1)identify and delineate spawning grounds in select regions in Pamlico Sound; and 2) classify nursery grounds by determining whether there are unique microchemical signatures in otoliths of juvenile red drum captured in habitats fringing Pamlico Sound.

Specific Priority(ies) in Solicitation to which Project Responds:
Groundfish and Estuarine Fishes - Red Drum

Summary of Work: (For continuing projects, include progress to date) Over a two-year period, we will determine whether adult red drum exploit both coastal river mouth and tidal pass inlet habitats for spawning through extensive field surveys. We will examine the microchemical characteristics in the core of otoliths in young of year red drum settled in nursery ground habitats to identify the salinity of water at the time of hatching. This could provide more compelling evidence that the coastal river mouth spawning grounds are making contributions to recruitment of settled juveniles. Furthermore, it should provide a measure of the magnitude of that recruitment relative to juveniles that originated from inlet and shelf waters. Finally, we will examine microchemical signatures at the outer edge of the otoliths from young of year fish to provide a means of classifying estuarine nursery habitats. This could lay the groundwork for classifying adults to natal estuarine habitat, leading to novel insights into stock structure and migration patterns. This information could lead to a straightforward method of identifying important habitats supporting critical early life history stages of red drum, and perhaps other estuarine dependent species of concern, in the South Atlantic region.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$167,000	$157,295		$324,295
Non-Federal	$ 36,036	$ 36,936		$ 72,972
Total	$203,036	$194,231		$397,267

NA17FF2884

MARFIN PROJECT SUMMARY

Project Title: Red Drum in South Carolina Waters: The Use of Bottom Longline Gear to Develop Indices of Relative Abundance of Adults in Coastal and Near Shore Waters

Project Status/Duration: New _____ Con't X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Dr. Charles A. Wenner
South Carolina Department of Natural Resources
PO Box 12559
Charleston, SC 29422
Phone: (843) 953-9232

Principal Investigator(s) and Brief Statement of Qualifications:
Charles Wenner - MA, Ph.D. in Marine Science from College of William and Mary (VIMS); 30-plus years experience in fisheries including research surveys; age, growth, reproduction; former member of several ASMFC Technical Committees including red drum, spotted seatrout, weakfish, Atlantic croaker

Project Objective: The goal of the proposed research is to generate fishery independent indices of abundance of adult red drum in the coastal ocean and estuarine waters of South Carolina

Specific Priority(ies) in Solicitation to which Project Responds: Investigating the size and age composition of adult red drum in the ocean will provide information on mixing, the extent of migratory activity, and complement data on fishing mortality and emigration rates developed from estuarine tagging programs. This information is crucial for future stock assessment work.

Summary of Work: (For continuing projects, include progress to date) The following objectives have been developed to meet the research goal:
1. To conduct fishery independent longline sampling on adult red drum to develop information on catch per unit effort (CPUE), size, age and sex composition.
2. To tag adult red drum for the collection of migratory and stock identification data.
3. To determine the age composition and reproductive status of red drum <90 cm total length (TL).
4. To tag and measure small and large coastal sharks caught incidentally to red drum sampling for inclusion in the COASTSPAN (Cooperative Atlantic States Shark Pupping and Nursery Survey) data base.
5. To disseminate accomplishments and results to the ASMFC and NMFS for inclusion in stock assessment efforts.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 75,679			$ 75,679
Non-Federal				
Total	$ 75,679			$ 75,679

NA17FF2885

MARFIN PROJECT SUMMARY

Project Title: Atlantic Croaker, *Micropogonias undulatus*, Along the Middle Atlantic Coast and Southeast Coast of the United States

Project Status/Duration: New_____ Con't__X__ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Dr. Charles A. Wenner
South Carolina Department of Natural Resources
PO Box 12559
Charleston, SC 29422
Phone: (843) 953-9232

Principal Investigator(s) and Brief Statement of Qualifications:
Charles Wenner - MA, Ph.D. in Marine Science from College of William and Mary (VIMS); 30-plus years experience in fisheries including research surveys; age, growth, reproduction; former member of several ASMFC Technical Committees including red drum, spotted seatrout, weakfish, Atlantic croaker

Project Objective: To provide pertinent new information on the biology of Atlantic croaker along the east coast of the United States for future stock assessments of this valuable resource.

Specific Priority(ies) in Solicitation to which Project Responds: Project will provide life-history information on Atlantic croaker in middle and South Atlantic, including abundance and distribution.

Summary of Work: (For continuing projects, include progress to date) The proposed project will:

1. Re-evaluate the interpretation of trasverse sections of sagittal otoliths for age determination
2. Host a workshop directed at aging problems of Atlantic croaker
3. Calculate growth equations from the resulting size-at-age data
4. Update maturity schedules throughout the region
5. Generate cohort-specific indices of abundance of Atlantic croaker caught during the NMFS Albatross IV fall groundfish survey cruises for the "tuning" of age-structured population models
6. Examine the parasitic fauna of Atlantic croaker along the east coast of the United States to determine if there are latitudinal differences in the species composition that may be compared to the findings of genetic analysis
7. Provide a final report summarizing our findings
8. Distribute all data sets to the Atlantic croaker Technical Committee of the ASMFC for subsequent inclusion in future assessments
9. Make available age data sets from resource surveys to NMFS at Woods Hole, MA

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 72,262	$ 74,540	$ 76,930	$223,732
Non-Federal				
Total	$ 72,262	$ 74,540	$ 76,930	$223,732

NA17FF2874

MARFIN PROJECT SUMMARY

Project Title: GIS Analysis of Fishery-Dependent Data in Relation to Definition of Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas in the South Atlantic Bight

Project Status/Duration: New_____ Con't__X___ Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:
George R. Sedberry
South Carolina Department of Natural Resources
PO Box 12559
Charleston, SC 29422
Phone: (843) 953-9814

Principal Investigator(s) and Brief Statement of Qualifications:
George R. Sedberry: Ph.D. in marine science; 22 years research experience in South Atlantic Bight (fish, fisheries, GIS)
John C. McGovern: Ph.D. in marine science; 15 years research experience with southeastern marine fishes
Philip Weinbach: MS in geographic analysis; 5 years research experience with GIS analysis of SAB ecosystems

Project Objective: Format existing MARMAP fishery-independent trawl, trap, longline, hydrographic and ichthyoplankton data into an ACCESS database that can be incorporated into a GIS; integrate with existing SEAMAP bottom mapping database to relate fish distribution with habitat type and hydrographic parameters; perform spatial analyses to determine the relationships among distribution of larval, juvenile, adult and spawning fish with bottom and hydrographic features; incorporate GIS and database into a web-based framework made available to more effectively plan future mapping, exploration, and management in the South Atlantic Bight.

Specific Priority(ies) in Solicitation to which Project Responds:
B. Reef Fish. 3. Management of reef fish. (b) Identification of prime sites for the establishment of reserves in the U.S. South Atlantic
F. Essential Fish Habitat. 4. Develop GIS mapping protocols and tools to allow the presentation of EFH, HAPC, fishery distribution information, and other relevant data for the southeastern United States

Summary of Work: (For continuing projects, include progress to date)
Data from several sources will be used to examine spatial trends in abundance, biomass, diversity and distribution of fishes of the continental shelf and upper slope from about Cape Hatteras, NC to West Palm Beach, FL. A GIS will be developed by expanding an existing database built on MARMAP fishery-independent trawl data. The GIS will examine historical and current databases for areas that might be considered Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas. Data to be incorporated include region-wide fishery-independent trawl surveys (1973-1987), region-wide fish trap surveys (1978-2002), ichthyoplankton surveys (1973-

2002), data on reproductive biology of reef fishes compiled by the MARMAP program, and SST and color satellite imagery. GIS analysis will be aimed at mapping areas of high abundance, biomass and diversity, by determining locations that are above the mean value of these parameters for the region. In addition, the GIS will provide maps of distribution and relative abundance of priority reef fish species (e.g. snappers, groupers), and locations where spawning has been documented. The MARMAP ichthyoplankton database will be examined for spatial and temporal patterns in occurrence of larvae of priority reef fishes, which will indicate spawning and/or recruitment areas. Data layers will also include dominant oceanographic features of the region, which will be described in relation to fish distribution. The GIS will be built upon existing MARMAP GIS and SEAMAP bottom mapping efforts. Data layers and metadata will be incorporated to allow investigators to examine species composition, habitat quality and other data that exist for SEAMAP habitat cells. The GIS product will be made available on CD-ROM, and incorporated into the OPIS on-line interactive GIS at the NOAA Coastal Services Center in Charleston. Results will be compared to potential MPA sites being considered by the SAFMC. While potential MPA sites have been chosen by the SAFMC with specific fishery management criteria for reef fishes in mind, preliminary spatial analysis of MARMAP trawl have indicated that additional analyses of existing data are needed and that GIS protocols should be developed with consideration of EFH, HAPC and MPAs in mind.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 95,000	$ 98,786		$193,786
Non-Federal	$ 16,112	$ 16,112		$ 32,224
Total	$111,112	$114,898		$226,010

NA17FF2868

MARFIN PROJECT SUMMARY

Project Title: An Intertemporal and Spatially Dynamic Supply Model of the Gulf of Mexico Shrimp Fleet for Use in Management and Bycatch Reduction

Project Status/Duration: New_____ Con't___X_ Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Board of Supervisors
Louisiana State University & Agricultural and Mechanical College
Office of Sponsored Programs
330 Thomas Boyd Hall
Baton Rouge, LA 70803-2701
Phone: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Walter R. Keithly, Jr., Associate Professor, School of the Coast & Environment
Dr. Richard Kazmierczak, Jr., Associate Professor, Department of Agricultural Economics

Project Objective: The overall purpose of this study is threefold: (1) to develop defensible parameter estimates that can assist in explaining changes in the behavior of shrimp fishermen in relation to economic stimuli and/or potential management measure; (2) to develop more defensible measures of effort and bycatch; and (3) to use these parameter estimates to forecast levels of bycatch at a temporal and spatial scale.

Specific Priority(ies) in Solicitation to which Project Responds:

1.f(1) economic considerations of bycatch reduction
7. General

Summary of Work: (For continuing projects, include progress to date) Secondary data, including the NMFS Vessel Operating Unit File and the NMFS Shrimp Landings File, will be used to accomplish the objectives set forth in this three-year research proposal. Specifically, the changes in the behavior of Gulf of Mexico shrimp fishermen in response to economic stimuli and management measures will first be derived using microeconomic and econometric considerations. These parameter estimates derived from this analysis will then be used to develop a joint production function that will allow one to examine expected changes in bycatch in relation to the changes in behavior of shrimp fishermen due to changes in economic stimuli or management measures.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 94,970	$106,274	$ 85,989	$287,233
Non-Federal	$ 42,745	$ 43,558	$ 42,098	$128,401
Total	$137,715	$149,832	$128,087	$415,634

NA17FF2869

MARFIN PROJECT SUMMARY

Project Title: Economic Valuation of Marine Reserves in the Florida Keys as Measured by Diver Attitudes and Preferences: Implications for Valuation of Non-Consumptive Uses of Marine Resources

Project Status/Duration: New_____ Con't__X___ Project Period: 15 Months

Name, Address, and Telephone Number of Applicant:

Rosenstiel School of Marine & Atmospheric Sciences
4600 Rickenbacker Causeway
Miami, FL 33149
Phone: (225) 361-4608

Principal Investigator(s) and Brief Statement of Qualifications:
Dr. David Letson - Associate Professor of Marine Affairs and Economics. Expertise in natural resource economics, fisheries economics, and contingent valuation. Research and teaching experience in contingent valuation studies, pollution prevention, and fisheries socioeconomics.

Project Objective: To determine the value of a non-consumptive activity, diving, on marine reserves-as measured by contingent valuation and user attitudes-and to identify the factors that either enhance or reduce marine reserve value, by addressing the following: Determining the monetary value that divers place on (and are willingness-to-pay for) individual marine reserves in the Florida Keys; ranking the attributes offered by the marine reserves that enhance diver visitation and satisfaction; and, developing a matrix that evaluates diver preferences for individual marine reserves.

Specific Priority(ies) in Solicitation to which Project Responds: General Priority 9. Studies to evaluate the value of non-consumptive uses of marine resources, especially as related to diving activities and marine reserves.

Summary of Work: (For continuing projects, include progress to date) As marine reserves become more important in both the Gulf of Mexico and South Atlantic region (as evidenced by the South Atlantic Fishery Management Council's Spring 2000 scoping meetings on the marine reserves and the Gulf of Mexico Fishery Management Council's participation in and passage of the Dry Tortugas Ecological Reserve), their uses may often offer both fishery and non-fishery benefits. Diving is definitely one such non-fishery benefit, but it can only be evaluated best if its total benefits can be determined and contrasted against its total costs.

Using contingent valuation in a survey questionnaire format, the project will determine the value placed on six marine reserves in the Florida Keys National Marine Sanctuary by divers. The project will also collect information on travel costs and user attitudes and preferences, to complete a comprehensive view of diver valuation and preferences. The reserves selected shall elucidate the effects of partial and total closures to other consumptive activities, as well as the effects of other natural attributes. Results from the study will be shared with NMFS scientists at the Southeast Fisheries Center, as well as regional council panels, to assist in the future site designations and determination of allowable activities.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 81,040	$ 6,683		$ 87,723
Non-Federal	$ 16,856	$ 1,390		$ 18,246
Total	$ 97,896	$ 8,073		$105,969

NA17FF2877

MARFIN PROJECT SUMMARY

Project Title: Factors Affecting Participation in Marine Fisheries: Case Studies in Georgia and North Carolina

Project Status/Duration: New ____ Con't X Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

University of Georgia Research Foundation, Inc.
621 Boyd Graduate Studies Research Center
Athens, GA 30602
Phone: (706) 542-5939

Principal Investigator(s) and Brief Statement of Qualifications:
Benjamin G. Blount - Professor of Anthropology (Ph.D. 1969). Has conducted research for six years on the Georgia coast investigating marine fisheries and fishers' perceptions of environmental issues.

Project Objective: To identify the factors in two counties (McIntosh, GA and Brunswick, NC) that have motivated commercial fishers to leave the industry and recreational fishers to begin fishing for sport and leisure

Specific Priority(ies) in Solicitation to which Project Responds: G. General, 11. Examination of the motivational causes that determine fishing behavior

Summary of Work: (For continuing projects, include progress to date)
First Year: interviews with commercial and recreational fishers in McIntosh Co; preparation of survey form for recreational fishers and mail to 1,500 individuals. Analysis of data.

Second Year: interviews with commercial and recreational fishers in Brunswick Co., NC; preparation and mailing of survey form for recreational fishers to 4,000 individuals. Analysis of data. Preparation of report.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	$ 61,560	$ 67,661		$129,221
Non-Federal	$ 30,656	$ 31,658		$ 62,314
Total	$ 92,216	$ 99,319		$191,535

Appendix 5

MARFIN PUBLICATIONS AND REPORTS

MARFIN PUBLICATIONS

Ball, A.O., G.R. Sedberry, M.S. Zatcoff, R.W. Chapman and J.L. Carlin

2000. Population structure of the wreckfish *Polyprion americanus* determined with microsatellite genetic markers. Mar. Biol. 137: 1077 - 1090.

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